

A Chilton Publication

The Iron Age

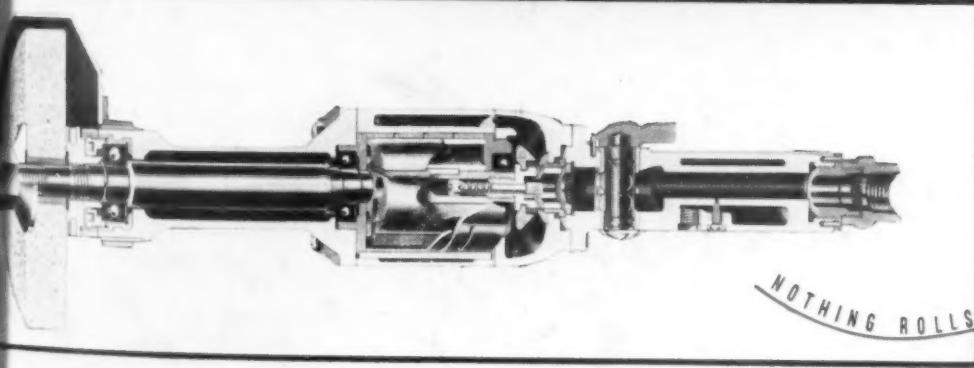
THE NATIONAL METALWORKING WEEKLY • SEPTEMBER 16, 1954

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MOTOR
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KEEP
ME
AIR"!



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Rotor Tool Company design utilizes three New Departure ball bearings. Front bearing is wider to give greater surface on shaft and housing to withstand vibratory loads.

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NEW DEPARTURE BALL BEARINGS

NEW DEPARTURE • DIVISION OF GENERAL MOTORS • BRISTOL, CONNECTICUT
Plants also in Meriden, Connecticut, and Sandusky, Ohio
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ing the line against maintenance downtime! Three Departures in the Rotor Tool air grinder need no adjustment but lubrication requirements to virtually zero.

New Departure double-shielded bearings are protected from foreign matter. They have the high capacity to carry axial and thrust loads . . . to withstand the shocks of hard use and handling. At the same time, cool-running New Departure bearings maintain accurate alignment and assure maximum life at the grinding wheel.

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- Produced in the industry's most modern, air-conditioned plant to give you *top precision*.
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- Backed by Rotor Tool's 25-year reputation for applying the *right tool for your job*.

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these tools.*

*See how they can
cut your costs!*



VERTICALS

SPECIAL BULLETINS ON ALL TOOLS ON REQUEST



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SANDING MACHINE



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ANGLE DRILL



MIDGET GRINDERS



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GRINDERS

AIR
THE ROTOR TOOL CO.
CLEVELAND, OHIO

HIGH
CYCLE

"UNBIASED ANALYSIS OF PORTABLE TOOL PROBLEMS"

Tool Steel Topics



BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

The Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation



Boiler Shop Using Bearcat Rivet-Sets Ups Average Run from 300 to 2470

The mechanical department of a large boiler shop had trouble driving more than 300 hot rivets, using standard rivet-sets. Once that mark had been reached, the sets would crack or spall. Sometimes recutting saved the day, but oftener than not the sets had to be replaced.

We were sure they could get longer runs with rivet-sets of Bearcat tool steel. The management gave Bearcat a trial, and put six sets to work after a heat-treatment cycle consisting of preheating at 1200°F, air-quenching at 1750, and tempering at 550.

The results were even better than expected. The average run increased from 300 to 2470 before recutting was required. Not only that, but the recutting was accomplished without heat-treatment, which of course is a frequent source of trouble with rivet-sets of carbon tool steel.

Bearcat is an ideal tool steel for the manufacture of rivet-sets because of its superior shock-resistance. It is also well suited for uses where hot-work properties and easy machining are essential.

BEARCAT'S BIG FEATURES

1. Super shock-resistance
2. Deep-hardening . . . in air
3. Machines easily (Brinell 197 max)
4. Low distortion in heat-treatment
5. Good hot-work properties
6. Easily carburized for long wear

Typical Analysis

C	Mn	Si	Cr	Mo
0.50	0.70	0.25	3.25	1.40

In addition to being used for rivet-sets, Bearcat is ideal for such hot- and cold-shock applications as chisels, punches, hot headers and gripper dies. It has many other uses, too — master hobs, engraving dies, die-casting dies, and short-run dies used in cold-forming, blanking and bending.

You'll be well pleased with the service life obtained with Bearcat. We stock Bearcat in our mill depot. Or you can obtain a supply through your local Bethlehem tool steel distributor.

BETHLEHEM TOOL STEEL ENGINEER SAYS:



Use Care When Hardening Hot-Work Tools

Although hot-work tools can be hardened to Rockwell C-56-60, there are hardly any applications where such hardness is beneficial. The majority of hot-work tools are used in a hardness range of C-41-44, or C-46-49. On new hot-work applications, a common mistake is to heat-treat to a hardness level which is too high for the application, with the result that rapid heat checking or breakage occurs.

For example, put tools of our Hot Work 8 analysis to work at C-55 or higher, and chances are, they will fail prematurely. Yet these same tools, used at Rockwell C-52 or lower, will give outstanding service.

On every hot-work application the best hardness level must be determined by experience. There's always a compromise involved, as the highest hardness is best for wear-resistance, and the lowest hardness is more resistant to heat-checks. Our suggestion? To be sure of maximum service, don't overharden hot-work tools.



IT'S A-H5 FOR LONG PRODUCTION RUNS

This high-production die, made of A-H5, blanks and punches sheet steel of 0.180-in. thickness. A-H5 makes possible long production runs between grinds. It holds a durable cutting edge, and resists distortion in heat-treatment.



DIGEST OF THE WEEK IN

Starred items are digested at the right

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NEWS DEVELOPMENTS

SEE STEADY GROWTH FOR CAPITAL GOODS—P. 107

Signs point to a rosy future for capital goods producers. While the post-war boom is likely to taper off over the next several years, the long-range outlook is for an average increase of 3 pct per year. Current level should hold for about 5 years. Reasons for increase will be: Higher labor costs, competition, new tax laws, natural growth of economy and campaign to induce industry to replace equipment regularly.

CHEMICAL FIRMS BUILD INTERLOCKING PLANTS—P. 109

DuPont, Union Carbide, Hooker Electrochemical team up in chemical development on Michigan's lakeside salt beds. Interrelated production activities to turn out neoprene, chlorine, caustic soda. The \$30-million project may draw other related process plants, form nucleus of vast chemical complex.

FINANCIAL PLANNING SAVES MONEY, TROUBLE—P. 110

Many owners of small business are kept so busy with daily affairs they don't give enough thought to financial and estate planning. This is unfortunate because sound planning can save unnecessary taxes now, as well as prevent unnecessary difficulties later. With cooperation of a well-known bank, THE IRON AGE presents the first in a series of articles on financial and estate planning for small businessmen.

COLD-FORMING FUTURE LOOKS VERY BRIGHT—P. 115

A Midwestern firm has obtained good results cold-forming several metals. Other firms are also exploiting advantages of different cold-forming processes. New developments are expected to help growth. Production speed, good properties make it attractive.

REDS HOLD TIGHT REIN ON FINN ECONOMY — P. 120

Reparations demanded from Finland in 1944 forced the Finns to borrow, set up industrial machine. Cost of production keeps Finnish industry from competing with West, channels all their output to Reds. Finns lack raw materials to enter into trade with Free World. Economy is locked in gear with Russia's.

PLANNERS SEEK STANDBY CONTROL LAWS — P. 137

Threat of federal controls on economy is real but won't materialize unless war comes. But planners still want standbys. Reds see how far they can push U. S. as Administration tries to avoid shooting.

ENGINEERING & PRODUCTION

STUD WELDING USE LOWERS TOOLING COSTS—P. 161
 Productivity has been nearly doubled while simultaneously reducing tooling investment through the use of stud welding. Elimination of corrosion problems, simplified assembly and less use of expensive jigs and fixtures are further advantages. Carbon and stainless studs are specified.

STRESS-CORROSION CRACKING PREVENTED — P. 165
 Corrosion control is especially important to parts or assemblies made from aluminum alloys which are subject to stress-corrosion cracking. Two types of coatings have been tested. One type prevents direct contact between the metal and atmospheric electrolyte while the other acts anodically to prevent electrolytic corrosion.

IMPROVE MACHINABILITY OF MALLEABLE IRON—P. 168
 Good machining properties of malleable iron can be assured by use of the proper melting practices which have been recently tested to prevent a pearlitic edge or a deep ferritic edge.

ALLOY FASTENINGS MUST MEET RIGID SPECS — P. 171
 Alloy fastenings for elevated temperature service must meet rigid specifications for size, finish and mechanical properties. They require careful fabricating, special heat treatments and quality control checks at each processing stage.

BETTER MOLD CASTING IMPROVES BATTERIES — P. 174
 Practically flawless storage battery plates are being produced by improved permanent mold casting techniques. Metal and mold temperatures are automatically controlled. Metal is fed to the mold through a closed tube to minimize drossing.

NEXT WEEK:

STAMPINGS: SHOULD YOU MAKE THEM OR BUY THEM?
 If the above question has been bothering you, this coming article may help clarify your thinking. One important metal stamping company has appraised both *bought* and *made* stampings on a basis of facts, not theories. It claims "patterned" thinking has clouded the issue.

MARKETS & PRICES

SCRAP FUTURES TRADE STARTS IN CHICAGO — P. 113
 Long awaited trading in scrap futures started last week on Chicago Mercantile Exchange. Tonnage traded in first 3 days totaled 2600 tons of No. 1 heavy for January and March delivery. Trade still waits and watches though problems seem solved.

SHUTDOWNS, DEMAND PINCH COPPER SUPPLY—P. 119
 Strikes at Anaconda, Miami Co. mines and Phelps Dodge refinery cut into copper backlog. Healthy consumption in electrical and construction industries, plus upcoming demand increase from automotive users threatens a tight market. Biggest squeeze will hit in October. Warehouses report steady business upturn.

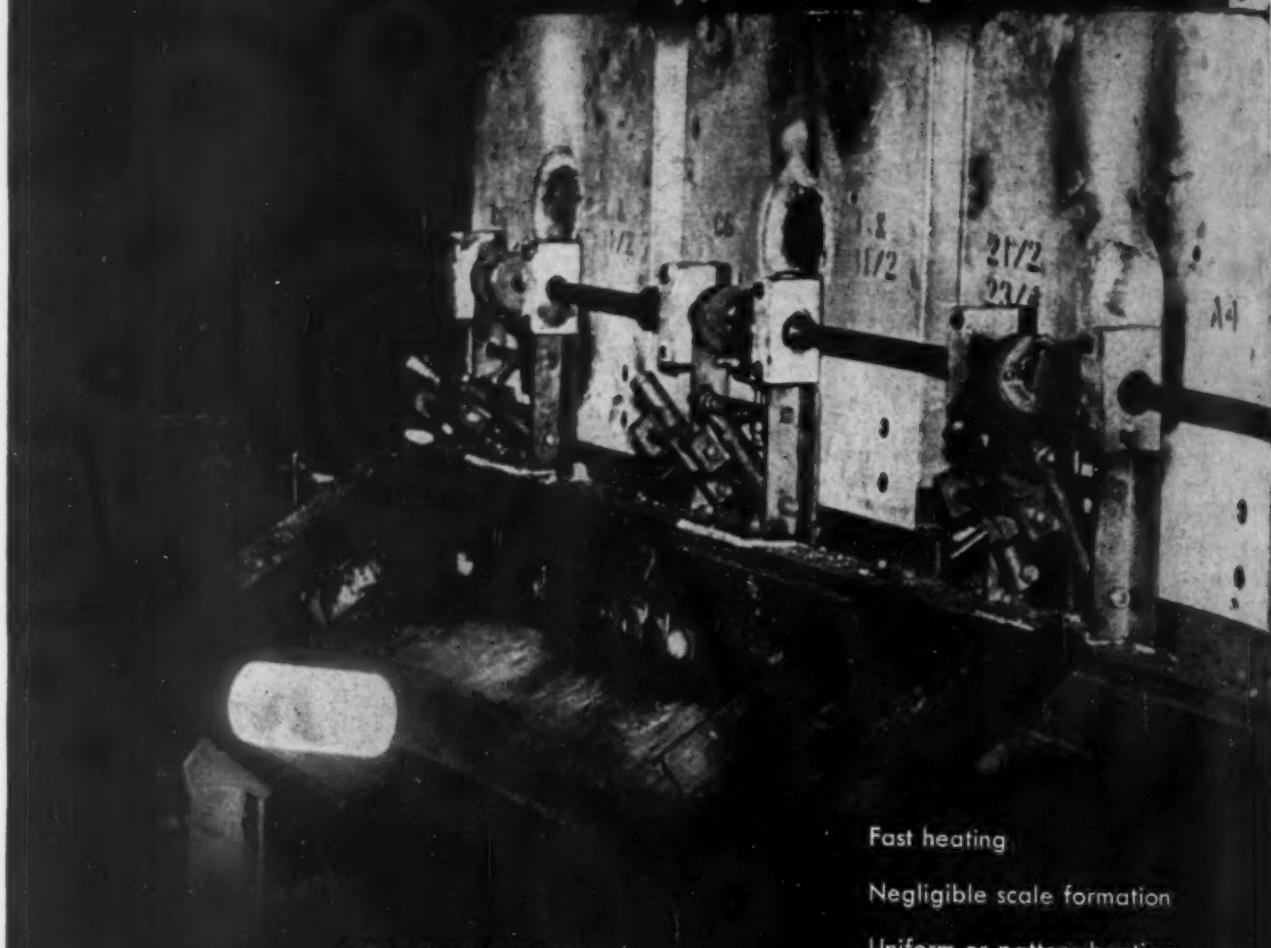
BIGGEST AUTO MODEL CHANGES IN 20 YEARS—P. 132
 Production of 1954 models has almost ceased as over 10 different makes undergo major assembly line surgery to accommodate new engine, chassis and body tooling. Packard will get new torsion bar suspension too. Changeover costs are astronomic although exact figures are industry's most guarded secret.

REDUCE SOME STEEL PRICES IN DETROIT — P. 219
 A Detroit producer dropped prices from \$2 to \$3 a ton on alloy blooms, billets and slabs, cold-finished carbon bars, hot-rolled alloy bars, and cold-drawn alloy bars. Other producers in the area were expected to make retroactive adjustments. Out of area producers said they would meet the new prices by absorbing freight. Prior to reductions, these items had commanded a premium in Detroit. The new prices are the same as major producers in other areas charge.

SOME STEEL PRODUCTS GET A BULLISH TONE—P. 221
 Steel industry is talking-up the fourth quarter up-swing. As yet there's little increase showing up on the order books. There's a mild step-up in automotive and appliance orders. Oil-country goods may ease.

DOUBLE MELTING IMPROVES ZIRCONIUM, TITANIUM
 Improved homogeneity and less contamination in both titanium and zirconium ingots will be possible with a new double melting technique. Production of unalloyed zirconium by the double melting method will permit a recovery of 95 pct in the form of finished ingots free from flaws. Power costs are low.

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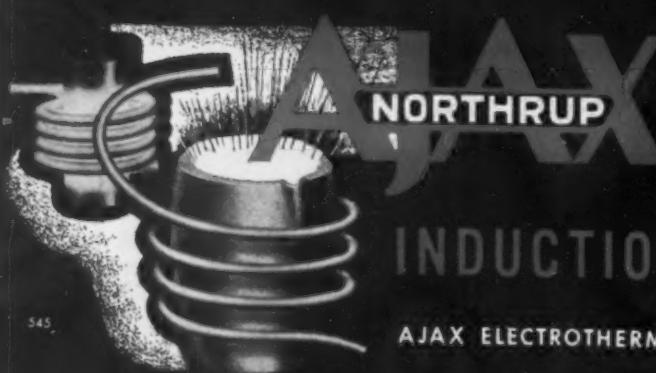
Fast heating

Negligible scale formation

Uniform or pattern heating

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Competitive overall costs



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Indexed in the Industrial Arts Index and the Engineering Index.



Editorial:

Who Is Behind The U.S.A.?

FOR the first time in our history we face the possibility that we could be defeated by a foreign power while our would-be allies stood by or were wiped out. That premise is the starting point for those who take their facts without sugar coated pills.

The Russian and Chinese communist rulers have become arrogant and self-confident. They have become contemptuous of America. Of such stuff are blunders in judgment made; and blunders of judgment could set off a full scale atomic war.

The rash of "co-existent" tactics between our major allies and Russia may be a symptom or symbol that they will be able to do little for us in case of an atomic war. France and Britain believe themselves to be dangerously vulnerable. Their self-interest and the apparent hopelessness for the future may be causing them to grasp at diplomatic straws-in-the-wind.

We are a roadblock of almost insurmountable proportions to the communist march toward world domination. No realist can believe that "peaceful co-existence" means anything more than allowing Russia and China do what they want to do—without shooting for it.

No businessman who looks squarely at the facts can expect the cold war to end during his lifetime barring an all-out hot war. Limited wars are "semi" cold wars used by one side to test resistance and by the other to stop encroachments. Neither makeshift appeasements nor trading with the enemy will change the course or character of the Communists' plans.

Yet the alternative to "peaceful existence" is not World War III. It is living day to day knowing the danger of backsliding, knowing the danger of precipitous or ill-timed action and realizing that dollars and cents budgets are no substitute for matching—and exceeding—the Communist world's ability to attack and defeat us.

It is a cold-blooded fact still that the Reds have convinced otherwise intelligent people in England and Europe that the Communists have mended their ways.

There is no one behind Uncle Sam. When we accept this as a fact and quickly prepare for its significance we will have a greater chance of outliving communism—without becoming an isolated citadel of despair.

Tom Campbell
EDITOR

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a double life!



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ATLAS ROLLER CHAIN

dear editor:

letters from readers

Commendation

Sir:

Please accept our compliments for a job continuously well done. The management of True-Trace finds THE IRON AGE consistent in bringing timely and meaty information to our attention. . . . G. F. Fry, Jr., President, True-Trace Sales Corp., El Monte, Calif.

Labor Relations

Sir:

I read with interest your article "UAW: Studie Vote Historic" by Mr. Raddant in your Aug. 19 issue. I would appreciate your permission to quote some, or take some parts of this article and use them in our Superior Steel House Organ. We feel that this article very factually and briefly tells an important story on the changing of the American industrial scene.

We are not sure, at this moment, what we expect to do with it but would like your permission for reprinting it giving credit to the source. S. I. Burgan, Superior Steel Corp., Carnegie, Pa.

Semiconductor Materials

Sir:

In the July 17 issue of Technical Survey there appeared the following item under heading "Building, Heating, Ventilation and Refrigeration":

"A British research group is said to be seeking new semiconductor materials with high electrical conductivity and low thermoelectricity for use in refrigeration. A cooling effect of almost 50°F was achieved by passing a current through a junction of silicon and germanium."

Would it be possible to get a tear copy of the above, which appeared in your July 1 issue, or could you inform us the name of the British research group or some

other clue whereby we may obtain further data on the new material. N. Bourque, Secretary, Product Engineering Dept., Milwaukee Gas Specialty Co., Milwaukee.

More information may be obtained from General Electric Ltd., Magnet House, Kingsway, London.—Ed.

Plywood Tanks

Sir:

In your Aug. 19 issue we have noted a brief description of an acid pickling tank fabricated from plywood.

Would you kindly give us the address of the Tacoma Powdered Metals Co. in order that we may write them for additional information on this very interesting looking development. T. O. Holland, Manager of Purchases, O. Ames Co., Parkersburg, W. Va.

The address is 1501 Taylor Way, Tacoma, Wash.—Ed.

Air Compressor

Sir:

I noticed in the July 29 issue of THE IRON AGE, on the Newsfront page, an item regarding a sliding vane air compressor.

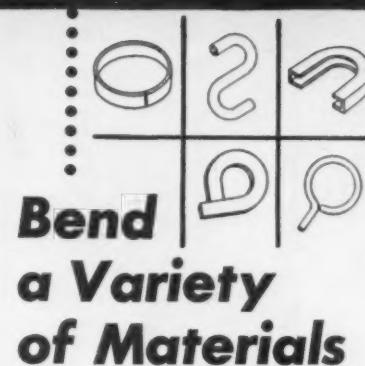
Would it be possible for you to advise us the source of this compressor as we might be interested in purchasing some of these machines. L. A. Ellner, Vice-President, Yeomans Bros. Co., Melrose Park, Ill.

For more details write to H. M. Petersen, Consulting Engineer, 2647 Buchanan St., San Francisco 15, Calif.—Ed.

Chromium Plating

Sir:

We have read and noted with interest your article on "Chromium Plating Properties," Table 25 in the July 29 issue. We would appreciate receiving six copies of the article. E. Buban, Superintendent, Detroit Div., Detroit Harvester Co., Detroit.



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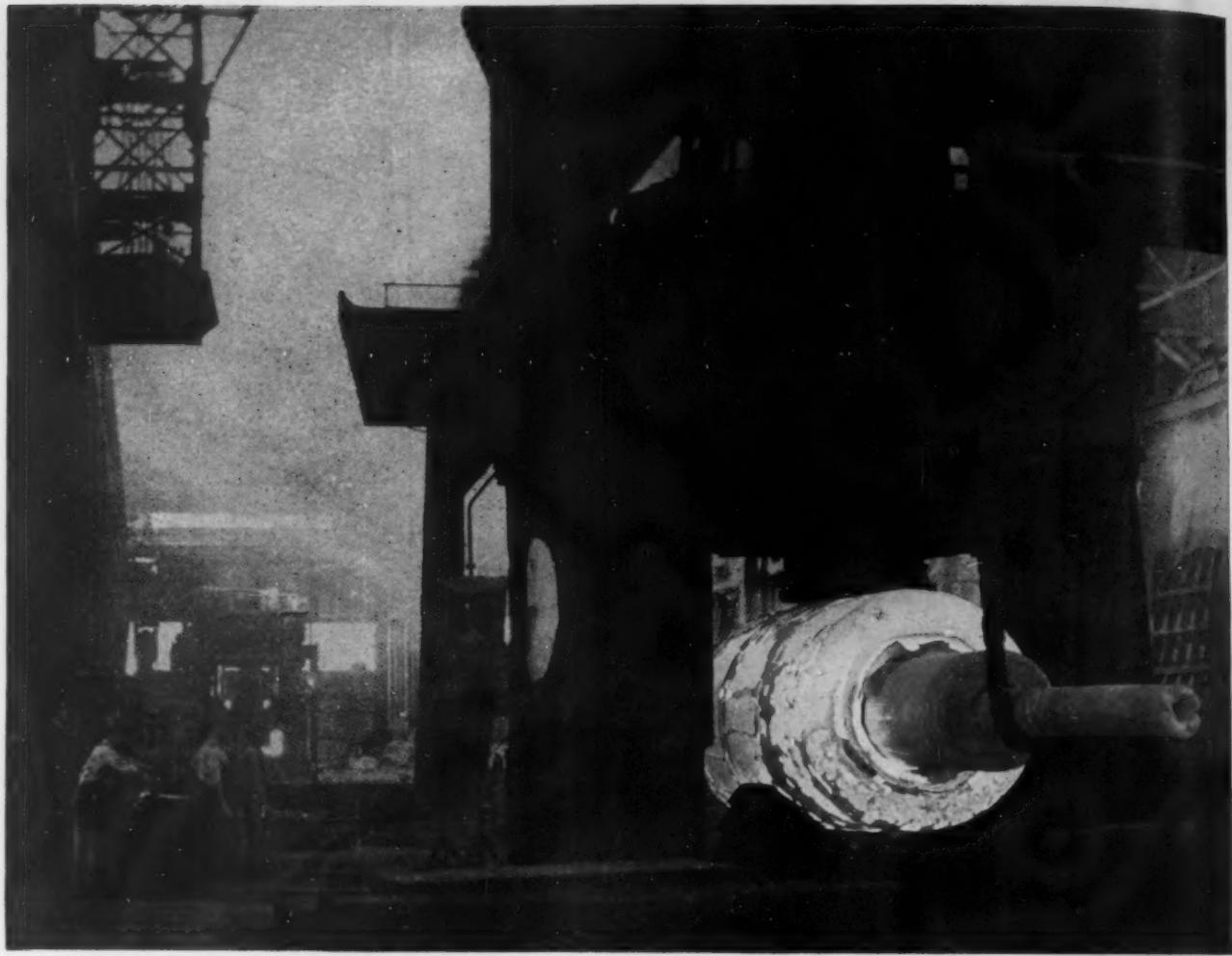


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fatigue cracks

by William M. Coffey

The Iron Queen

We get many calls for back issues of your favorite family journal—librarians on research projects, engineers on research projects, students on research projects wanting bound copies back to 1883 or 1066. (Ed. Note: William The C landed in England. Voilà!)

Most such requests we fill from here, depending directly on the square of the distance involved. But many we must refer to public libraries for bound copies of IA. Recently we found a new source for bound copies as a result of our plea several weeks ago for old photos and historical material we could use for our 100 Year Anniversary issue.

Just outside Clifton Forge, Virginia, is the old Lucy Selina furnace where "high in the hills of Western Virginia, Lucy Selina reigned as The Iron Queen. For more than 80 years she was monarch of Allegheny County, 1827 to 1911." The Iron Queen's house is now the Lucy Selina Inn, a lovely tourist establishment with cabins, chicken, fried steaks, corn pone, seven sweets and seven sours on the table.

The second floor of the house has many old metalworking prints on the wall and bound copies of THE IRON AGE reaching nearly to 1066. So, any more requests for old Iron Ages we will refer to the Lucy Selina Inn, RFD 1, 10 miles E. at Longdale Furnace on U. S. 60, Clifton Forge, Va. Phone 13F23.

(Wonder if some of Lucy's iron hit my old Uncle Rob at Stone River in '63? He was a fine fellow. Used to show me his wound for 50¢).

The Iron King

You must have noticed the change in your IRON AGE. Our issues may go back to 1066 (Battle of Hastings, ole boy), but our format today is as forward-looking as the Mars Development Company. It's

more attractive—nay, sire, it's beautiful. (Remember the old poem? Scene shifts to Field of Waterloo where the courier rides furiously up to le general Ney with a message from the left flank, hands over the message, then falls off his horse (Texas french). At which such occurrence le general Ney allows, "I say, there, you're wounded. Voilà." To which the courier replies, "Nay, sire, I'm dead, Voilà." And, you know, he was? Scene shifts back).

Our format is beautiful—and it's easier to read. Our 23 loyal readers have told us so, but the editors want to know, too. Good for morals. So look this issue over carefully, s'il vous plait. Compare it with one about a month ago. See for yourself and then let us know your reaction.

Puzzlers

Everybody wants to know where Broeker can buy cheese for 36¢ a lb, but the answer anyway is 45¢ that the lady laid on the table and she bought 35/36ths of a lb (Aug. 26 puzzler). The winners: Duane H. Feisel, Hugh H. Lee, Jim Lawless, Earl R. Ziegler, James W. Mull, Jr., Dale Letterman and Charles H. C. Sanders, R. T. Connolly, John R. Ellison, J. Wm. Horan, H. W. Ebert, R. M. Burns and G. Alsterlund of Chicago 45.

New Puzzler

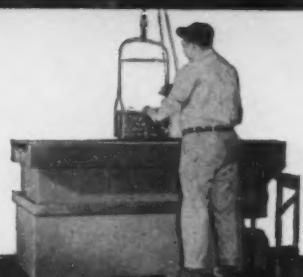
J. Wm. Horan, Chief Metallurgist, American Crucible Products Co., submits one for the horsey set: A man has a certain number of horses which he wishes to divide among his three sons. The horses are to be divided as follows. The oldest son to receive one half of the horses PLUS one-half horse; the youngest son to receive one-half of the remaining horses PLUS one-half horse. All horses to be alive and on the hoof.

What was the original number of horses and how many did each son receive?

Do a Better Job Faster...

cut cleaning costs

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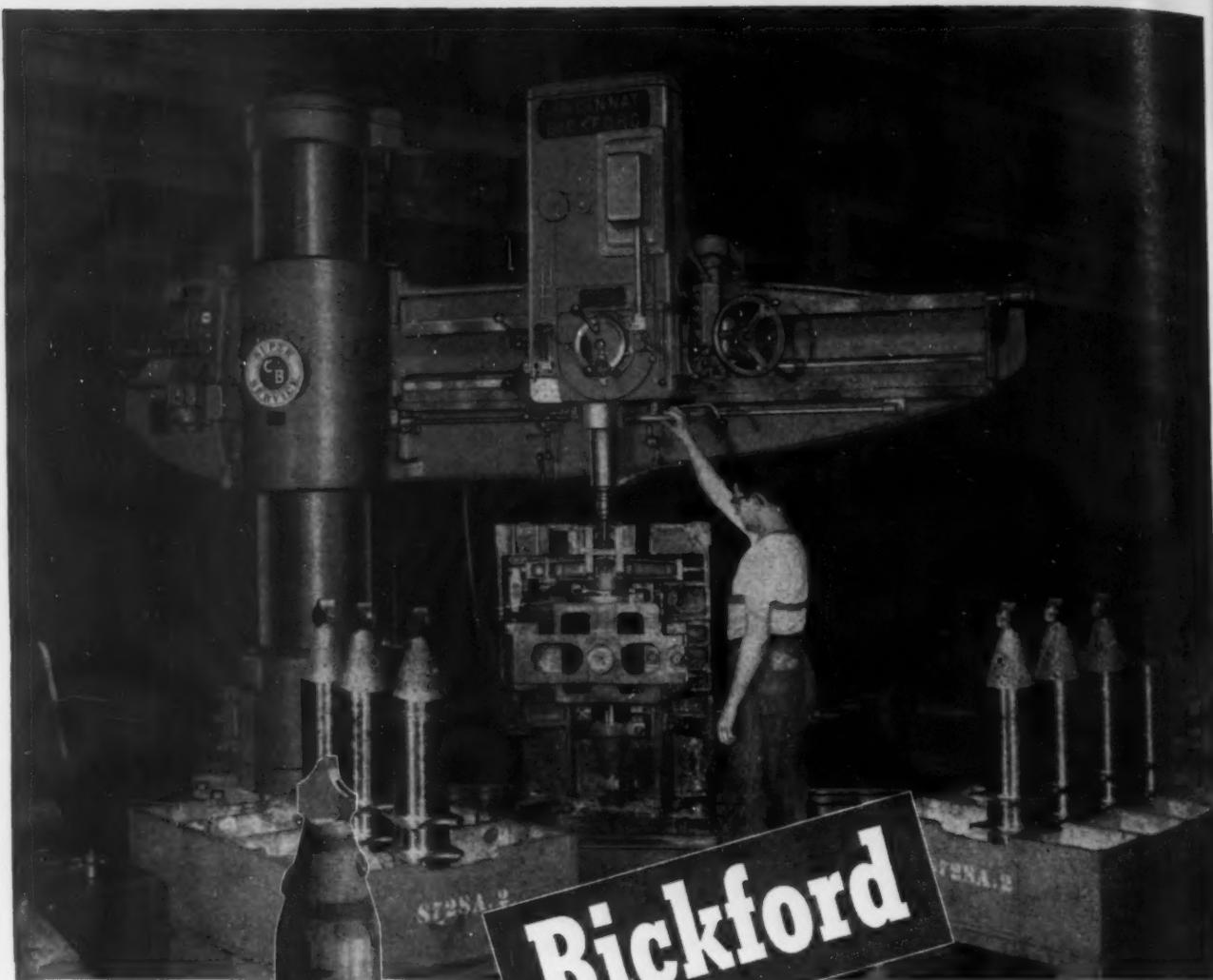
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The convenient centralized controls, the wide range of speeds and feeds, and the high visibility head of this Cincinnati Bickford Radial Drill are all contributing to fine performance on this job.

The Cleveland Pneumatic Tool Company say "Performance and ease of handling are all that could be desired."

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Cincinnati 9, Ohio, U.S.A.

The Iron Age Newsfront

Ford Stock Sale Confirmed

Sale of Ford stock, confirmed by family members, does not mean the corporation needs working capital. Stock will be sold to broaden the base of Ford Foundation holdings, not to create cash for the auto company's expansion programs. No stock will be sold by the Ford Motor Co. as such.

Removes Hydrogen From Titanium

Vacuum annealing is proving practical in removal of hydrogen from titanium and titanium alloys. One manufacturer of aircraft parts is annealing 400 lb heats. A 24-hour cycle is necessary to reduce hydrogen to negligible quantities. In this cycle the material is at heat only two hours. Balance of the cycle is taken up in heating and cooling the load.

More Inquiries for Ordnance Materiel

Definite stepup in inquiries for ordnance materiel, including ammunition, indicates military is getting ready in the likely case it is told to build up stocks. Best estimate in light of present international situation is that pronounced increase would be deferred until after elections.

Foundries Like L-F Melting

Foundries are finding low frequency induction melting pays off. One company has been melting for production of pearlitic and regular malleable for some time and recently a second company put a low frequency melting furnace into operation for production of ductile iron.

Bank Parts for Transfer Machines?

A hot debate as to whether banks of spare parts should or should not be permitted in connection with big transfer machines has developed in the auto industry. Some major producers have avoided banks of parts entirely in their planning. Others aim to have as much as an hour's supply of semifinished parts so transfer machines can be operated by sections if required.

"Hipot" Cuts Checking Time

Electrical connections in the Army's complex Skysweeper antiaircraft gun are tested speedily by use of a new device which resembles a large pinball machine. This automatic high potential and continuity tester, developed by private industry, cuts 39 hours from time required to check largest of the Skysweeper wiring harnesses.

Larger Copper Drawing Equipment

Much larger equipment is being used by one producer to draw copper tubing. The concern is contemplating draw benches up to 200 feet long in a new expansion program soon to get underway.

Market for Electrolytic Cells

Students of the atom are considering fusion as well as fission as a means of producing power. Some mathematicians think deuterium may ultimately become a source of commercial power. Deuterium is presently obtained in small quantities by electrolysis of water. Provided a new process is not discovered, this could ultimately mean a greatly expanded market for electrolytic cells.

Modular Kitchen Meets New Needs

Development work on a modular kitchen embodying a new concept of modern kitchen design providing maximum kitchen and appliance facilities in minimum space, has been completed. Next phase will be organization of manufacturing channels to make the unit available to mass builders. The modular kitchen, representing a new approach in the field of kitchen design and appliance development, offers metalworkers a potential market for services and products.

Giant Band Saw

A giant contour band saw that cuts tool steel 25 in. thick and weighing up to 10 tons is now being used. The operator, seated in a chair 10 ft above the floor, guides the huge saw through a set of mirrors. The saw, standing 15 ft high, weighs 16,000 lb, covers 400 sq ft area.

CMP

COLD ROLLED STRIP STEEL

Having ear trouble? If your drawn product requires trimming to remove ears or scallops, you may be able to reduce your end-product cost by the use of CMP non-earing (non-scalloping) cold rolled strip steel.

This is one of many ways in which CMP engineers specifications and processing methods to enable strip steel users to produce better products at lower cost.

Perhaps we can help you to reduce end-product cost without capital investment.

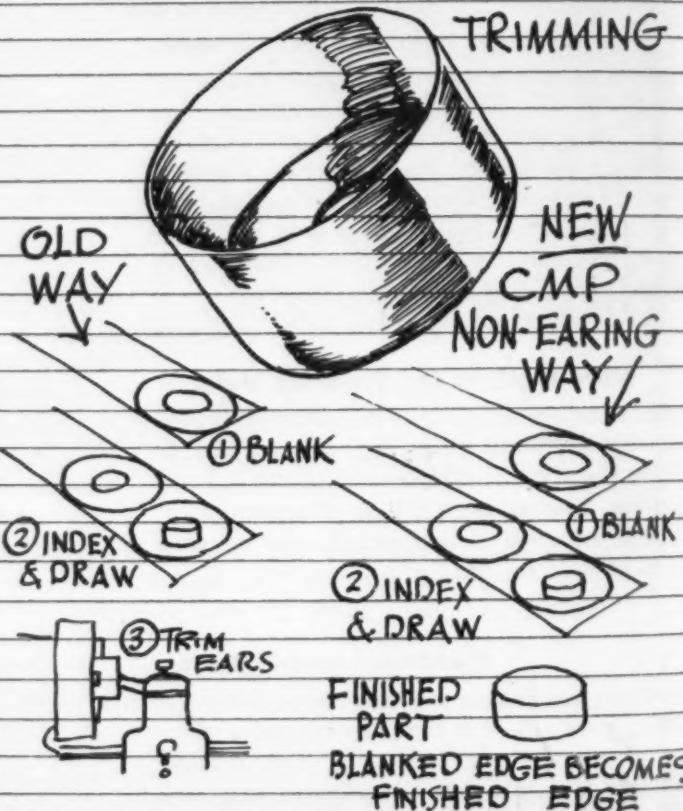


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See Steady Capital Goods Growth

Post war boom in capital goods will taper but long-range outlook is 3 pct annual increase . . . Trend is spurred by higher labor costs, new tax law, competition, growth of economy—By J. B. Delaney.

• SIGNS point to a rosy future for the vital capital goods industry. Economists say there are good reasons why American industry is likely to invest heavily in plant and equipment over the next 5 to 20 years.

While these projections are understandably qualified due to the vagaries and unpredictable tangents that may be taken by the national economy, the optimistic outlook appears to be reasonably well founded.

Due to the inter-dependence of American industry, the optimistic projections for capital goods would point to a stable overall economy during the next several decades.

The post-war boom in capital goods, while likely to taper off during the next several years in relation to record-breaking 1953, probably will continue at about the 1954 level during the next 5 years.

Expect Long Term Growth

Looking further ahead, the Machinery & Allied Products Institute foresees the possibility of a growth in such spending of 3 pct per year compounded between now and 1975, or approximately the long-run historical rate.

If this projection proves out, buying for plant and equipment will approach \$40 billion by 1960 and \$60 billion by 1975, compared with approximately \$32 billion this year and \$34 billion last year. MAPI figures include agricultural spending but exclude current expense. Capital goods is defined as "the facilities of production,

distribution, transportation, communication, and commerce."

Heavy spending for capital goods since the war is attributed to (1) a heavy backlog of so-called deferred demand built up during the depression and the years immediately following, and (2) wear and tear on equipment during the war.

Some studies indicate that the "catching up" process is just about completed.

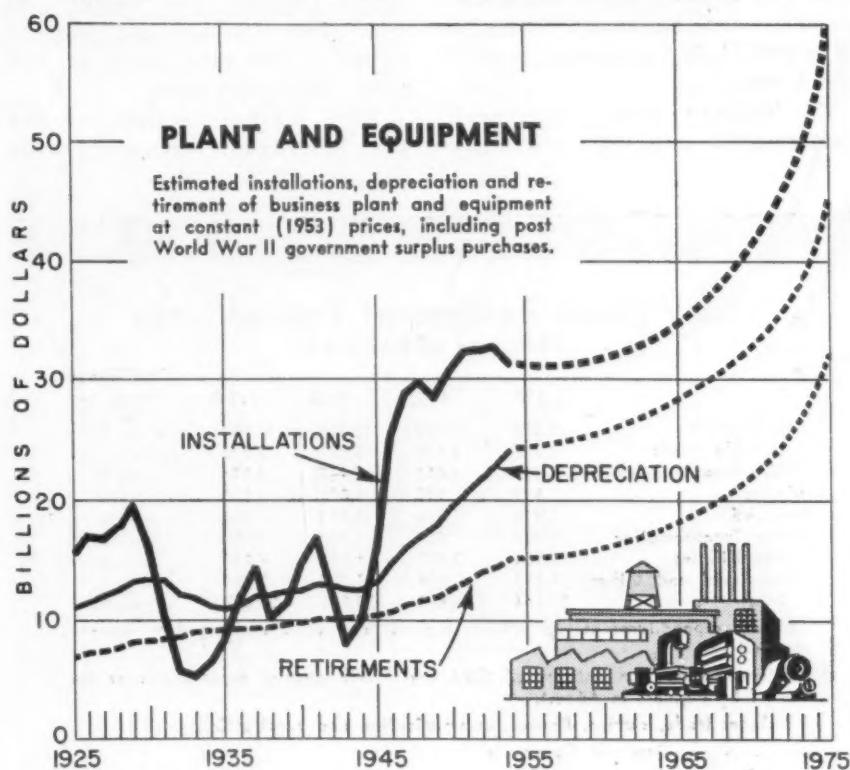
Why Spending Will Gain

But there are other factors considered likely to prod industry into continuing heavy spending for capital goods. These include:

- Necessity of offsetting ever-increasing labor costs with more efficient equipment. An added inducement is the fact that equipment costs have risen on an average only about half as much as industrial labor costs since 1939.

- With return to a peacetime economy, equipment manufacturers are able to concentrate on improving their products. This is likely to encourage industry to discard older equipment in order to remain competitive. During the war, when builders were forced to focus on then-current models, the incentive to invest in new equipment was not so great.

- New tax rules permitting faster depreciation are likely to encour-



SPECIAL REPORT

are quicker replacement policy. • Natural growth of the economy. MAPI estimates that non-farm business needs to invest \$25 billion to absorb the annual growth in the labor force, maintain existing plant and equipment, and provide for a modest growth in investment per worker.

• Equipment builders are concentrating on a campaign to induce industry to regularize its replacement of equipment. Lack of a sound replacement policy in many industries has been one of the toughest problems capital goods companies have been up against.

Outlook for capital equipment is considered better than for plant for the reason that it not only is cheaper in relation to industrial wage cost, but is also cheaper in relation to new plant costs.

See 6 Pct Dip in '54

Meanwhile, the short-term outlook is for the current year to finish as the second highest in history. Expenditures for new plant and equipment are gradually declining during 1954 and will fall slightly under 1953, Securities and Exchange Commission and U. S. Commerce Department report.

If industry plans announced last month are carried out busi-

ness will spend \$26.7 billion on new plant and equipment, only 6 pct less than the all-time high of \$28.4 billion in 1953.

This apparent disparity between government statistics and MAPI figures is explained primarily by the fact that MAPI includes agriculture while Commerce Dept. doesn't.

Some Hold '53 Level

Business programs indicate spending in the third quarter will be at a seasonally adjusted annual rate of \$26.8 billion and \$26 billion in the fourth quarter of this year. The rate in the first quarter was \$27.5 billion and \$27.2 billion in the second quarter.

Most of the \$1.5 billion decline from the first to the fourth quarter is attributed by the government to declines in manufacturing outlays, particularly durable goods and railroads, because other major industries show little change.

Manufacturing concerns, according to the survey, plan to spend \$11.3 billion for new plant and equipment this year, 8 pct less than last year. The larger concerns, those with assets of \$100 million or more, report scheduling capital expenditures about the same as last year. Electric power, mining and commercial companies are also planning to spend at the same level as last year, the report says.

Most marked decline for the year is in fixed investment by the

railroads which are scheduled to spend only \$850 million, 35 pct less than last year.

Motor vehicle and other transportation equipment companies recorded considerable strength in their capital purchasing plans, scheduling a record \$1.5 billion outlay for the year, an increase of 30 pct over 1953. This is in contrast to reductions by most of the durable goods industries.

Metals Plan Less

Primary metal industry, including iron and steel and nonferrous, expects to spend one-third less this year than last, the report says.

Non-electrical machinery firms will spend less for new equipment this year, and textile, chemical and rubber companies have cut their expenditures about 15 pct below those of a year ago.

Petroleum Spends More

Electrical machinery and equipment firms, and the stone, clay and glass products group plan to hold their 1954 outlays at about the same level as the previous year. Petroleum industry will spend at a record \$2.8 billion level, while food and paper concerns will continue at about the same level as last year.

Reduced outlays by the railroads, the report says, reflect both lower earnings and near-completion of the large post-war modernization programs.

May Buy Follansbee

Republic Steel Corp. may buy equipment and inventory of Follansbee Steel Corp. Purchase would be contingent upon approval of Follansbee stockholders of previously announced plan to sell corporate assets to a New York group (THE IRON AGE, Aug. 19, p. 78). Republic would move the flat-rolled facilities to its Gadsden, Ala., plant.

Merge Equipment Firm

Merritt-Chapman & Scott Corp., New York, took the first steps toward absorbing the Marion Power Shovel Co. and The Osgood Co., producers of construction equipment, by seeking Securities and Exchange Commission approval for a stock acquisition.

New Plant, Equipment Expenditures (Millions of Dollars)

	1951	1952	1953	1954*	Pct Change '53 to '54
Manufacturing	10,852	11,632	12,276	11,332	-8
Durable goods	5,168	5,614	5,821	5,198	-11
Non-durable goods	5,684	6,018	6,455	6,134	-5
Mining	929	985	1,011	1,008	-
Railroad	1,474	1,396	1,312	851	-35
Other Transportation	1,490	1,500	1,464	1,405	-4
Public Utilities	3,664	3,887	4,548	4,274	-6
Commercial and Other†	7,235	7,094	7,778	7,818	+1
Total	25,644	26,493	28,391	26,687	-6

Excludes expenditures of agricultural business and outlays charged to current accounts.

* Estimate based on anticipated third and fourth quarter expenditures as reported by business in August.

† Includes trade, service, finance, communication and construction.

Source: U. S. Dept. of Commerce

CHEMICALS: Build Michigan Plants

DuPont, Union Carbide, Hooker Electrochemical team up on Michigan salt beds . . . Interdependent, \$30-million operation will yield neoprene, acetylene, caustic soda—By R. D. Raddant.

♦ A NEW chemical industry is rising from the wasteland of Western Michigan where beds of salt from an ancient sea are being tapped for industrial utilization.

The three-company development north of Muskegon on the eastern shore of Lake Michigan will bring the Hooker Electrochemical Co., E. I. DuPont de Nemours & Co., and the Union Carbide & Carbon Co. into an interlocking, interdependent operation. Original investment will total nearly \$30 million for the twin villages of Montague-Whitehall.

Provide Chemical Nucleus

It is conceivable that within a few years other companies supplying or utilizing products of these three plants will gather around the nucleus in a network similar to that at Niagara Falls, N. Y., where a larger cluster of chemical operations surround plants of the same companies.

It is the second large chemical operation to rise above Michigan's 300,000-year-old salt beds. At Midland the Dow Chemical Co., world's largest producer of chlorine, was built on salt brine from similar deposits.

Produce Soda, Neoprene

At present, Hooker Electrochemical is the only one operating at Montague. It is producing caustic soda for its western markets, but will pipe anhydrous hydrogen chloride to the DuPont plant for its production of neoprene, a synthetic rubber. Union Carbide, in turn, will manufacture acetylene, a second major ingredient of neoprene manufacture, and pipe it directly to the DuPont plant from its new factory.

Hooker has constructed its \$12-million plant on the shores of White

Lake, which is connected by a short channel to Lake Michigan, providing an ideal harbor for lake shipment. In all, 3020 acres of land are owned or optioned. At 3100 ft below the surface is a stratum of salt 99.97 pct pure, 260 ft thick. Another 60 ft lower is a second salt bed 170 ft thick.

Ship Via Lakes

By electrolysis of the sodium chloride, Hooker produces chlorine compounds, caustic soda and hydrogen. On June 2 of this year the first cargo to leave the port in more than 50 years left the White Lake channel. It was a Hooker tanker barge carrying 400,000 gal of caustic soda to Chicago, where the company's storage yards had previously been supplied from Niagara Falls.

The DuPont plant will cost an estimated \$15 million and will augment the company's expanding neoprene production, now located at Louisville, Ky. The Union Carbide

plant, which will pump vinyl acetylene to the DuPont plant, will be erected at a cost of \$2 million. In this operation the calcium will be transported from the company's Sault Ste. Marie plant to Montague for generation into acetylene.

DuPont expects to start construction of its plant late this year with partial production anticipated by early 1956.

Renovate Plate Mill

Completion of renovation operations on Alan Wood Steel Co.'s 84 in plate mill was achieved last week reported company's president, John T. Whiting.

Renovation involved additions to existing buildings and installation of new equipment at a cost of approximately \$3,300,000. Modernized mill will enable Alan Wood to increase its plate production by about 20 pct annually.

Project was coordinated so that near normal rolling operations were maintained until early August when the mill was shut down for installation of certain new facilities.

Add Rotary Furnace

A new 55-foot rotary hearth slab heating furnace provides considerably more heating capacity than the six old furnaces it replaces. This furnace, with components, cost more than \$1,000,000.

Modernization included new plate layout and shearing facilities with late model rotary side shear. New shearing facilities, with components, cost over \$1,000,000.

Other new installations at the plate mill include a new scarfing yard, a high-pressure descaling system, new mechanical side guards at mill stands and a new four-high cold roller-leveler.



LOCATIONS of Michigan's new salt-based chemical industries.

ORGANIZATION: Should You Incorporate?

Proprietorship, partnership, or corporation—which is best for you? . . . Better check carefully before you decide . . . Changing type of organization can lead to tax savings and help keep firm going.

• IF A BUSINESS is to breathe freely in today's tax-saturated atmosphere, if it is to be kept going or profitably sold at an owner's death, it must be properly organized. Should a proprietorship or a partnership be continued, or is it better to incorporate? The importance of a business's organization can be demonstrated by a typical example:

With some borrowed money and a lot of faith in the future, Bill Williams started his business 15 years ago with a machine shop in a small garage. He worked hard. Today he owns a modern well-equipped plant and employs 120 people.

What Price Freedom?

Bill had, until a short time ago, operated his business as a proprietorship. He had at various times resisted the idea of incorporating simply on the grounds of letting well enough alone. He was paying high income taxes, but weren't his corporate competitors doing the same in addition to moaning about excess profits taxes? He could withdraw what profits he pleased and didn't have to explain anything to anybody. He compared his freedom regarding withdrawals with some of his small corporation-owner friends he heard complaining about the necessity of justifying the salaries they paid themselves, double taxation on dividends, and local corporation taxes.

But Bill had been paying a high price for this so-called freedom. His accountant showed comparative figures and it was found that in 9 of the last 10 years he would have paid substantially less income taxes if he had been incorporated.

In one year, for example, Bill's business had a net profit of \$53,000. His actual expenses that year for himself and his family were \$18,000. Nevertheless he had to pay personal income tax on the full business profit and after knocking off \$3000 for exemptions and deductions he reported \$50,000 personal income on which he paid a tax of \$20,300. If his business had been incorporated and he had taken \$23,000 as a salary the tax picture would have been as follows:

Personal income tax on \$23,000 salary (less ex- emptions and deduc- tions)	\$5,280
Corporate taxes on the net profit (after salary) of \$30,000 as follows:	
30 pct on \$25,000	7,500
52 pct of \$5,000	2,600
Total	\$15,380

Thus Bill would have saved \$5000 in taxes in that year alone.

But, asked Bill, wouldn't the government have something to say about this scheme of taking out \$23,000 as salary and thereby reducing the taxable income of

the corporation? The answer was that this would have been perfectly proper in Bill's case. The \$23,000 was a reasonable salary for a working president of a business the size of Bill's when compared with similar salaries in comparable businesses.

Liberal on Earnings

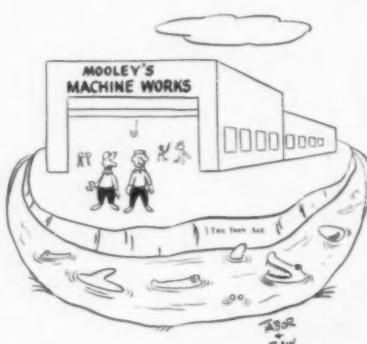
A revenue agent might question a corporate salary if it is far out of line when related to the value of the services performed. He could challenge an exorbitant salary as a dividend in disguise. But the Federal authorities have been fairly liberal in allowing substantial salaries for services actually performed.

What about the balance of earnings which would be left with the company? Bill had heard of cases where additional corporate taxes were imposed on improperly accumulated earnings. Here again he had no problem. Like most energetic business men, he had no idea of standing still. His philosophy was one of growth. He had no trouble finding use for any spare cash that was available. If a company has a large amount of accumulated earnings in cash and securities not needed for the business the government may demand an explanation of why no dividends are paid.

Decision Is Binding

The new Revenue Code, however, is more liberal than the old one in this regard. Under the new set-up even a modest-sized business can have an uninvested surplus of \$60,000 and no justification is required.

Bill's next objection had to do with another change in the Internal Revenue Code of 1954. He



"The boss is a crank about people leaving during working hours."

Try This Quiz for Small Business Owners

Many owners of small business are kept so busy with daily affairs that they don't give enough thought to financial and estate planning. This is unfortunate because through sound planning the small businessman can not only avoid payment of unnecessary taxes now, but he can also avoid untold difficulties for his family and his loyal employees later.

Here are a few questions you might ask yourself:

- Is my business properly organized?
- Do I have a will—and just as important—is it the right kind?
- In event of my death, shall the business be sold or kept going?
- If it is to be kept going, will there be enough cash?
- Have I avoided the hazards of joint ownership?
- Have I considered what a program of gifts to my children can do to reduce present and future taxes?

had read that from now on it will be possible for a proprietorship or partnership to obtain tax benefits similar to those granted to corporations. That is true, but what Bill did not realize was that in order to obtain such benefits the taxpayer must "elect to be treated as a corporation" and such election is irrevocable in future years unless there is a change of ownership. Hence, it is doubtful how valuable the new provision will be in the average case.

If corporate tax treatment is advantageous, actual incorporation will generally be preferable to an election under the Code because of the other benefits of the corporate form. These advantages apart from taxes were then related to Bill's plans for the future.

Bill had three sons. As each of them finished his education, he went to work in the business. All three were now making important contributions to the success of the enterprise and Bill wanted to give them the added incentive of a proprietary interest. How should he go about it?

Check On Gift Taxes

His present set-up—that of a wholly owned unincorporated business — would have to be changed to either a partnership or a corporation. If he changed to a partnership the sons' interests would be governed by the partnership agreement. The

trouble with this was that Bill wanted to do the thing gradually, starting his sons off with a nominal interest which could be increased as years went by according to how much each of them contributed to the business.

Another important reason for this gradual transfer of ownership to the sons involved gift taxes (which will be explained in a future article of this series). If the business was in the form of a partnership, this program of periodic gifts would mean a new partnership agreement each time a gift was made. With the company incorporated, on the other hand, the gifts could be made by simply transferring shares of stock to his sons as the occasion warranted.

Helps Simplify Estate

Another advantage of incorporation had to do with what would happen to the business on Bill's death. A proprietorship dies with the owner and a partnership is dissolved when a partner dies. A new partnership has to be formed by those who succeed to the ownership and new arrangements must be made with customers, suppliers and banks.

But if the business is in the form of a corporation the death of a shareholder has no direct effect on the company's legal existence. Bill's estate would have shares of stock (disposition of which he could control by his will) instead

- Have I furnished sufficient incentives to my key men?

If you can give positive answers to all these questions you belong at the top of the class. The unhappy truth is that too many small businesses have to be liquidated upon the death of the owner because of lack of proper financial and estate planning during his lifetime.

With the cooperation of Provident Trust Co., Philadelphia, and its vice-president, John J. Buckley, THE IRON AGE is presenting a series of articles on financial and estate planning. All case histories in the series are taken from the files of the Provident Trust Co.

While it is hoped that these articles will prove helpful, especially to the small businessman, any contemplated action should be checked with your attorney.—Ed.

of undivided interest in countless items of property comprising the business. There is no question that the task of Bill's executor would be greatly simplified if the business were incorporated.

Corporations Flexible

Other advantages of the corporate form were pointed out. Bill carried liability insurance, but when he heard examples of recent jury verdicts in personal injury cases he began to wonder if he had enough. With his business incorporated he should still carry adequate insurance but he would have the additional protection of the corporation's limited liability. At least Bill's home and savings would be safe from the hazards of the business.

The ability to take advantage of pension and profit sharing plans was also stressed. As president of a corporation, Bill would be an employee, eligible for these.

Finally, the various types of stock and bonds a corporation can issue were explained. The flexibility a corporation can offer in this respect and how voting control can be separated from the right to share in profits and various preferences established were pointed out. In Bill's case, for example, it was decided to have part of the business capital represented by corporate bonds which would provide a steady income for Bill if he ever retired and turned the management over

to his sons, and for Bill's widow after his death.

Check These Points

In the case of Bill Williams, all factors pointed to the advisability of incorporating, but this is not so in all cases. When incorporation is not advisable it is usually because the change would cause more taxes instead of less. Here are three things to bear in mind:

(1) **Corporate profits paid out as cash dividends are taxed twice—once to the corporation and once to the shareholder, so there is a tax-loss on every dividend dollar; the dividend credit in the new Revenue Code gives some relief but not much.**

(2) **Corporate profits paid out as salary or interest on corporate bonds are taxed to the shareholder but not to the corporation, so that on these dollars it makes no difference tax-wise whether the business is incorporated or not.**

(3) **Corporate profits retained by the company for expansion are taxable to the corporation and not to the share-holder. Hence, there is a tax saving on these dollars if, and only if, the rates such earnings would be taxed to the individual, are higher than the corporate rate of 30 pct on the first \$25,000 and 52 pct on the excess. Local corporate taxes must also be considered; these are not likely to be serious but they should be added on to the estimated corporate tax to make a fair comparison.**

Incorporation is most likely to be profitable in an expanding business managed by the owner or owners who will live on their salaries as corporate officers and use the balance of earnings to build up the business. But, if substantially all of current earnings are usually withdrawn each year by partners who take no active part in the actual management of the business, it would probably be foolish to incorporate because it would then be necessary for the corporation to distribute its earnings by way of dividends, thus subjecting the owners to double taxation.

Ask Your Attorney

The only sensible way to determine the probable tax effect of incorporating a business is to do what Bill did. Supply your attorney or accountant with your income tax returns and profit and loss sheets for the last few years, including a record of how much



Gage design differs from tool design in a great many respects.

Too Much Expected of Tool Designers?

Why do some firms insist on putting their tool designers on the spot? Why do they expect these highly-skilled specialists to engineer satisfactory gages for special requirements?

There are two reasons. Tool designers have performed wonders in their own field. So their managements understandably have great faith in them. Tool designers, by their very nature, love to solve problems. So, they accept the challenge involved in special gage designing.

It doesn't pay . . . because the experience of the average tool designer does not give him the answers to these questions: Is a *special gage* necessary? Which is the best gaging system for the job . . . air, dial indicating, electric, electronic? How much will a specially engineered gage cost . . . if required?

Designing machines, fixtures and tools involves holding work-pieces in position by force — trans-

ferring and transforming power to act as wanted—counteracting heavy stresses and strains.

Designing precision gages, however, requires knowledge of how to magnify and transfer measurement variations precisely, without loss of motion — with a minimum of friction and inertia in the working parts — and a hundred other details which do not concern the usual tool and machine designer.

To get the right answers . . . call in your nearby Federal sales engineer. He is backed by thousands of Federal gage designs and can give unbiased advice about air, dial indicating, electric or electronic gages . . . because Federal makes them all.

Our new booklet "A Management Blind Spot" reveals unappreciated shop situations and tells how they can be corrected. For your copy, write

**Federal Products Corporation,
4139 Eddy St., Providence 1, R. I.**

Ask **FEDERAL**

FOR ANYTHING IN MODERN GAGES...

Dial Indicating, Air, Electric, or Electronic — for Inspecting, Measuring, Sorting, or Automatically Controlling Dimensions on Machines.

was left in the business each year and how much was withdrawn for personal needs. He can then figure what taxes would have been if the business had been incorporated, and the comparison will be a sound basis for estimating what the situation will be in the future. If a tax savings is indicated, or even if it turns out that there will probably be little or no difference one way or the other, incorporation is advisable in most cases because of the benefits apart from taxes.

Keep It Formal

A word of warning if it is decided not to incorporate and there is more than one owner of the business: Be sure to have an adequate partnership agreement drawn by an attorney skilled in this field of the law. Oral agreements are trouble-makers — even among the most friendly parties — and "informal" written agreements with no provision or vague provisions for various contingencies such as death of a partner or liquidation are not much better.

Pool Market Research

Market research men from five non-competing New England machine tool manufacturers convened at Jones & Lamson Machine Co. in Springfield, Vt., Thursday, Sept. 9. The group proposes to combine market research thinking against mutual marketing problems in the machine tool field.

This meeting centered on THE IRON AGE magazine's "Census of Metalworking" as a marketing tool. Oliver Johnson, director of research for THE IRON AGE addressed the group and took part in discussion of the Census of Metalworking.

Who Attended

Registered for the meeting were: George A. Hawkins, Brown & Sharpe Mfg. Co.; Francis Hummel, Bryant Chucking Grinder Co.; Roger Magoun and Myron Smith, both of the Norton Co.; J. J. Jeager, James D. Allan and Charles Lucas, Pratt & Whitney Div. Niles-Bement-Pond Co.; H. H. Whitmore, N. R. Kidder (chairman of the meeting), and D. W. Mellor, Jones & Lamson Machine Co.

SCRAP: Mercantile Trade On

Chicago Mercantile Exchange begins trading of scrap futures . . . Trading totaled 2600 tons of January and March in first 3 days . . . Industry waits, watches.

♦ TUESDAY of last week the long awaited exchange of No. 1 heavy melting scrap on Chicago's Mercantile Exchange became accomplished fact. For the record, the first sale was to Mr. Ben Luria of York, Pa. (not connected with Luria Brothers or Luria Steel & Trading) and amounted to five contracts for January delivery at \$31.50 per ton.

Trading began shortly after the Exchange opened at 9:45. By close of trading at 11:45 a.m., January futures prices had risen to \$33 and a total of 35 contracts, or 1400 tons of No. 1 heavy melting scrap for January and March delivery had been traded. The single March sale was \$33.25 per ton.

Action Slows, Spurts

As the Exchange swung into action, six seats had been sold to firms specifically interested in trading steel scrap on the Mercantile Exchange, and another dozen previous seat holders had indicated that they would buy and sell scrap as they had apples, eggs and onions in the past.

Though sources outside the

steel scrap industry had suggested that they had hopes of seeing as much as 40,000 tons per month changing hands in Mercantile Exchange trading of No. 1 heavy melting, action on the second day was not strong. Though the January futures price advanced by another 50¢ per ton, only three units were sold, as January futures moved to \$33.50 and March went to \$34.

On Thursday the market perked up again. A total 27 cars were traded, the January future price went to \$33.75 per ton. There were still unresolved questions, even with the problems of margin, specifications, and inspection ostensibly solved. Inspection has been assigned by the Exchange to Robert W. Hunt Co., of Chicago. There is not yet confirmation, however, that mill scrap inspectors would abide by the ruling of another inspecting agency. And to refuse to accept delivery of scrap contracted for through a purchase on the Mercantile Exchange would amount to breaking the purchased contract.

Trade Attitude Watchful

While opening day at the Exchange was watched closely by local firms interested in steel scrap, there was little indication that the majority were changing their minds about their previous standby attitude. Mercantile Exchange president Everette Harris has been invited to St. Louis to discuss the workings of the Exchange and was expected to speak before another Iron & Steel Scrap Institute chapter in the near future.

But at Chicago, the industry preferred to wait and see how the Exchange worked out.



"Cut the comedy, and gimme the drink."

Circuits:

Mount parts mechanically in TV production line.

• AUTOMATION in the electronics industry is stepping rapidly ahead. Latest evidence is had by Admiral Corp. of an automatic assembly line for mounting components on printed circuit boards.

This circuit consists of 8 tubes and 69 other components and comprises about half the wiring in a new 21-in. TV set. Fifty of the components are inserted mechani-

cally, the rest by hand. Tedious manual soldering is eliminated entirely.

Boards with a circuit etched on one side are fed into a 30-ft battery of machines dubbed Robot I. These insert the necessary resistors and wire jumpers, after trimming and crimping leads, on the opposite side. Boards are moved automatically from station to station.

Line is controlled electronically and is so constructed that whenever any part fails to feed from the chute a red light goes on and the whole line shuts down automatically until the trouble is eliminated.

This is just the beginning for Admiral. Two other machines, one approximately 100 ft long, are

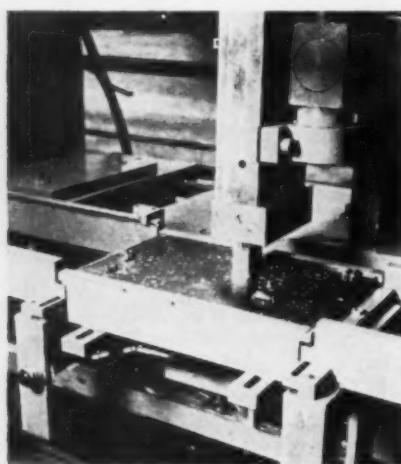
being built and will go into production early next year. The firm foresees practically no limit and predicts that machines will be able to insert more complex parts such as tube sockets and tubes which are now put in by hand.

Advantages of the printed circuit and automatic assembly include: more uniform production, trouble-free dip soldering, greater resistance to extremes of temperature and humidity, more flexibility of engineering, lower production costs and a more compact TV set.

And it's no case of technological unemployment! Rather than displacing workers, production has been stepped up to the point where it was necessary to hire more employees to complete final hand assembly of the printed circuit.



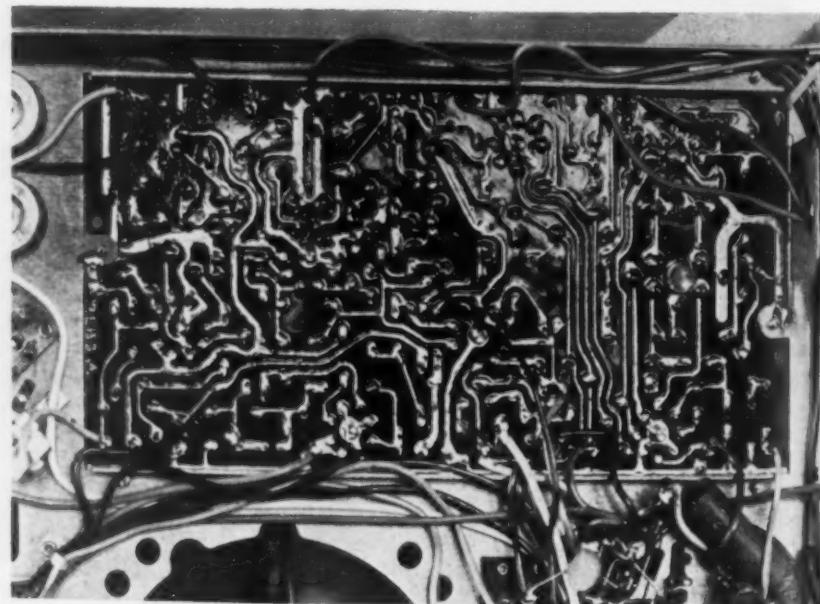
INSPECTING and retouching circuits produced 12 on a sheet, cut later.



RED LIGHT flashes whenever component fails to feed, machine stops.



ROBOT I, in background, adds components to printed circuit base.



INSTALLED PRINTED circuit embodies about half the wiring in new TV set.



DIP SOLDERING bottom of chassis after 69 components are in place.

COLD FORMING: Future Looks Bright

Camcar has obtained good results with several metals . . . Owes spectacular growth to cold forming . . . Other firms succeeding, too . . . Several new wrinkles expected . . . Growth seems assured—By K. W. Bennett.

WHEN CAMCAR, Rockford, Ill., cold forming firm, announced recently the marketing of a titanium fastener produced by upsetting methods, the news came as further confirmation that what was once simply "cold-heading" has become an advanced metal working process.

Fashioned of RC 130 B titanium, the bolt has a tested tensile strength of 150,000 psi; a 95,000 psi shear strength; and will perform at 800°F with fully retained properties.

Works on Others

With expected bulk buying of titanium fasteners for airframe construction due in about one year, the importance of the titanium fastener to Camcar and other producers of formed material is, at this stage, just becoming apparent. Increased titanium supplies, and the 44 pct weight savings in a titanium part, will boost the demand for this type of product in the next year.

The technical advance in upset forming of small parts is not restricted to titanium. Camcar, for example, has worked in stainless, high and low carbon steels, copper and aluminum. This from a firm that began as three men with a Quonset hut and an order for a single stainless steel aircraft part in 1943. The cold forming techniques developed by the firm's founders expanded the firm into its present two-plant, 200,000 sq ft operation, illustrative of the growth in demand for cold-formed components since 1946.

Has Potent Advantages

Why the strength of cold-forming demand? For small parts like those illustrated, the cold flow process offers a 10 to 15 micro in. finish.

tensile strengths to 180,000 psi, reported 50 pct closer tolerances than small machined parts, and an operating rate that may go to 400 parts per min for small pieces. Cost cuts in one case were from 19¢ per part down to as low as 2¢ per part.

Markets Still Develop

Special fasteners are available in sizes up to 1 in. diam. The diameter of the original shank may be upset to 8-9 times original diameter at any point along the shaft, as compared with conventional 5-6 times greater diameter through upsetting.

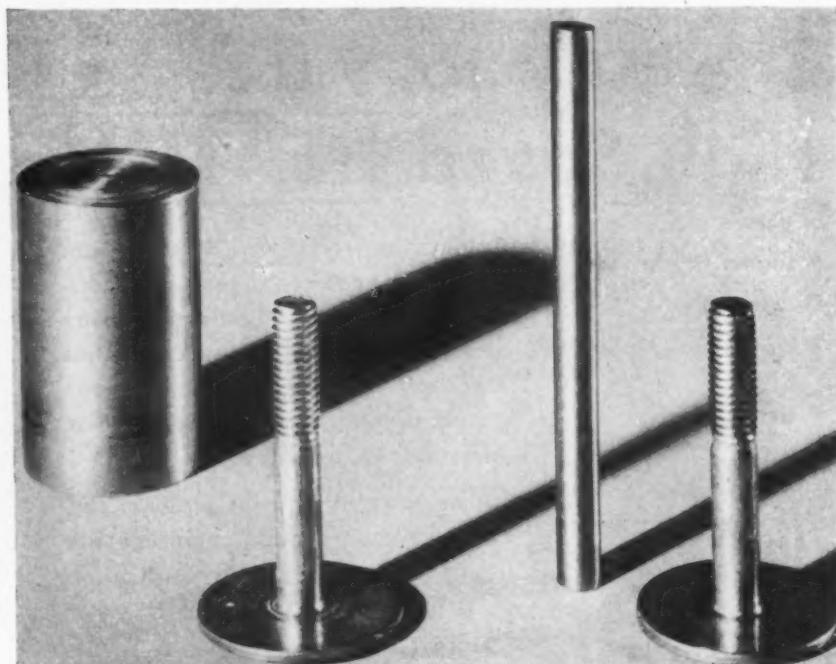
Cold flow processes, as exemplified by Camcar, are still developing potential markets. Camcar, though primarily a fastener producer, makes electronics parts, at least one small gear, even a cold formed

furniture drawer pull that had been previously cast. The selling points: a cold formed part can be produced with as little scrap loss as is possible.

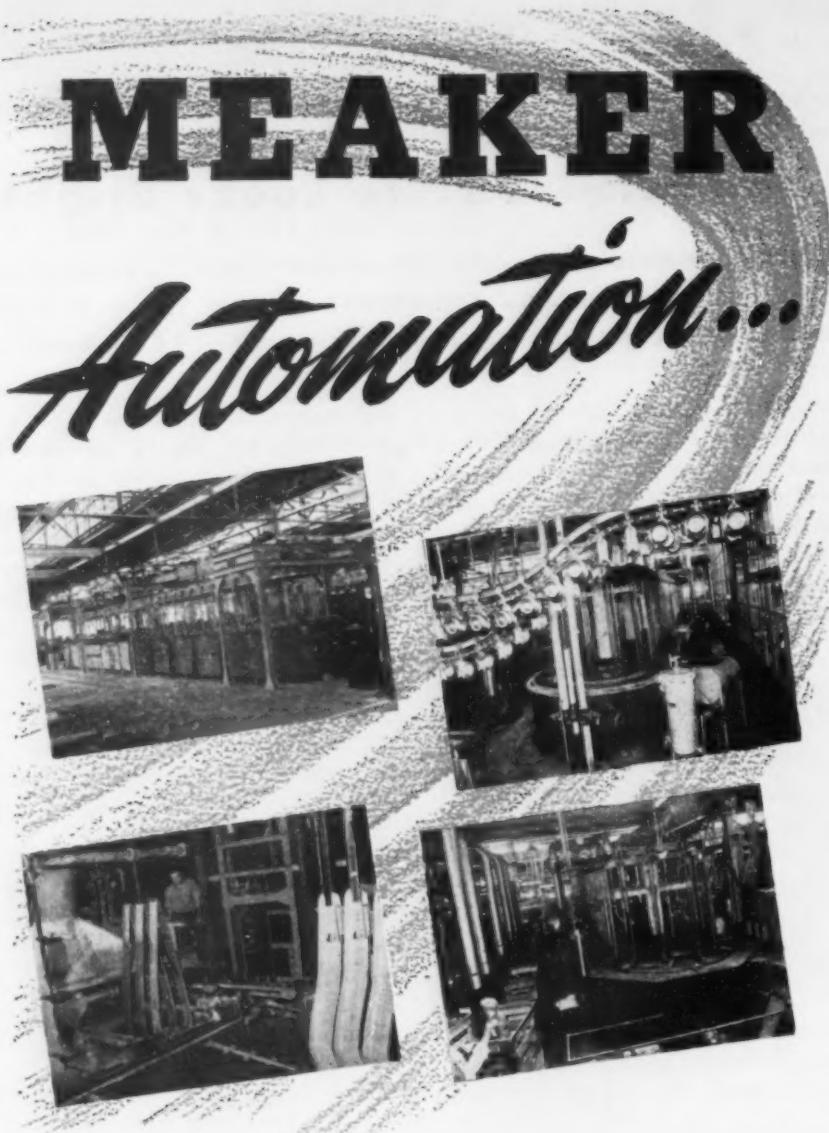
Virtually no machining is required, no cuts are made in the grain of the metal once the metal part has been squeezed into the shape in which it will be used. Complex parts of several diameters, and even with slotted shanks, are being produced, and economically.

Others Succeeding, Too

Camcar, while an early entry in the cold forming field, is certainly not alone. The Koldflo division of Mullins Manufacturing is producing cold formed cylinders up to 40 in. in depth and up to 6 in. in I.D. As a general rule of thumb, they'll look for applications in which cyl-



SPECIAL SCREW part at left was produced by conventional methods from accompanying bar stock. Same part at right, was produced from wire stock by cold-pressure forming.



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inder length will exceed diameter by at least 3-4 times, have to date been working largely in low carbon steels, but it is reported that stainless is on the way.

The Camcar experience suggests cold forming of gears and there are reports in the industry that at least two gear producing machines are in the development stage. Splining is already an accomplished fact, is not new.

Expect New Developments

Lodge & Shipley's Floturn, for handling conical or cylindrical parts, has been used in forming of stainless, brass, low and high carbon steels, and has been used in such tough forming jobs as zirconium and titanium with success.

Within the next year cold-working machines that are fully automatic and capable of handling large workpieces at rates of 400-500 pieces per hr are expected to be on the market.

Progress Just Beginning

Cold-forming of wire, rod, and bar, there is sufficient evidence to suggest, will expand their markets sharply within the next year. Camcar has been growing steadily in size since 1945, when it swung from military to civilian output.

Cold-forming of metal parts, either small or large, by actual flowing of the cold metal under pressure to conform with precision dies, has a good record to date. But from the volume of new inquiries being addressed to cold forming firms, it suggests that the gradual market development to date is only a beginning.



"Assembly Dept., quick!"

SOIL PIPE: Benefits From Standards

Although industry is already solidly established, new standards are expected to improve customer acceptance . . . Lower production costs expected, too . . . But customers will benefit most—By G. G. Carr.

♦ IT OUGHT to go without saying. Americans have a built-in appreciation of the values of standardization. But some of our best-established industries grew up without them. And many manufacturers shy off from the very real work involved in setting up product standards, hoping their products are well enough entrenched to get along without them.

You'd have a hard time finding a more solidly established industry than cast iron soil pipe. Heart of practically all sanitary systems, cast iron soil pipe flourished for years without benefit of a standards program. But when customers virtually forced the pipe founders to build industry specifications, a lot of unsuspected plus benefits came to light.

Helps Cut Costs

Adoption of a new standard for cast iron soil pipe and fittings, sponsored by Cast Iron Soil Pipe Institute, will bring uniformity of quality (including quality control and inspection procedures), cut standard weights from four to two, guaranteed that all pipe bearing the "CI" seal will be made to specified dimensions and tolerances.

Standardization should play an important part in lowering costs for all concerned by settling on two weights instead of the traditional four. Manufacturers will now be able to concentrate production equipment on fewer weights, while plumbing wholesalers and contractors can reduce inventories by carrying only two weights in stock.

Customers Benefit Most

Additional savings should also come from standardization of dimensions, making products from different manufacturers interchangeable. One headache in the past has been the necessity of mak-

ing and stocking a variety of closely related sizes to meet competition.

Another benefit of the new standard is improved customer relations. Greatest pressure to develop a soil pipe standard came from users disturbed by lack of uniformity and increasing amounts of substandard materials.

Traditional ideas got a rough going over during and after World War II, and the soil pipe industry was no exception. Accelerated war and postwar demand for all kinds of materials helped create many new manufacturers. Unfortunately many of the newcomers had more enthusiasm than experience, and there was often a fringe that was interested only in cashing in on a lush market.

Action Sorely Needed

Price cutting often cut quality as well in an effort to bring costs into relationship with selling prices. Some of the new soil pipe makers were forced to reduce fitting lengths to conserve materials. This often frustrated accurate estimating of pipe runs, particularly when several courses were needed to insure adequate supplies. Job delays and higher costs were common.

Additional problems came when inadequate facilities and relatively unskilled labor prevented proper and usual inspection of raw materials and finished products. Rejections by customers were high.

By 1949 leading pipe founders saw the need for concerted action, and formed the Cast Iron Soil Pipe Institute. Requests for an industry standard started coming in almost immediately.

Seek Uniform Dimensions

At the institute's first meeting in 1950, the guest speaker, Robert Wood, chief plumbing inspector, Los Angeles County, Calif., urged creation of a CISPI standard to eliminate substandard material and lack of dimensional uniformity.

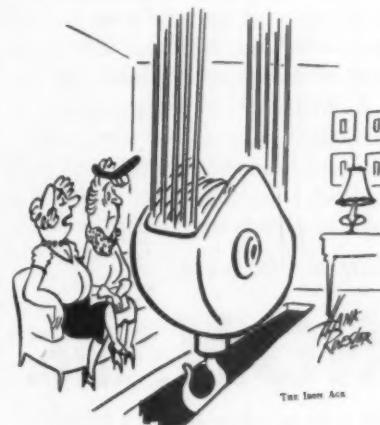
About the same time, Robert Murphy, a leading Chicago plumbing contractor (now president-elect of the National Assn. of Plumbing Contractors), also suggested that the cast iron soil pipe industry develop an industry-wide standards program.

Worked Long, Hard

NAPC's 1950 convention approved a resolution urging the cast iron soil pipe industry to establish standards for their products at the earliest possible moment. The convention also set up a special NAPC standard committee to work with the Cast Iron Soil Pipe Institute.

For the next several years the NAPC standards committee and the CISPI technical committee worked to establish a practical set of standards for cast iron soil pipe and fittings. First important problem was to determine how many different weights of soil pipe should be made. Until then four weights were usual: standard, victory, medium and extra-heavy.

Specifications for extra-heavy



"Homer has a small metalworking shop in the basement."

MANUFACTURING

(XH) pipe were relatively simple, since need for the product was established, and there was already in existence a standard set up by Federal Specifications WWP-401.

But the committees were impressed by the demand for low-cost housing and realized that a lighter pipe could mean valuable economies where XH was not required. But no standard for service weight soil pipe existed.

Building one took work. It meant complete surveys of manufacturers, plumbing contractors, engineers and others to determine the exact dimensions which would be most desirable and acceptable. Many meetings later, the committees had a set of service weight specifications, drawn up with the help of U. S. Commerce Dept.'s Commodity Standards Div.

Still Much to Do

Commodity Standards sent the proposed specs for comment to a cross-section of the thousands of people in the affected industries. Suggestions were turned over to the committees for study. Desirable changes were incorporated into the proposed standard. Letters of explanation were sent to everyone who sent in an unusable suggestion.

After more months of meeting, correspondence and sweat, final specs were readied, then published by Commerce Dept. Acceptance by the plumbing industry meant the committees' long job was about completed.

For soil pipe makers the job is just starting. Many have traditionally sold in a limited market area, are properly more concerned with local conditions than overall industry problems. Changing pipe and patterns to conform to the new specs is a big and expensive job. But judging from initial response, the soil pipe industry is sold on the benefits of its new standard.



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COPPER: See Tight Market Ahead

**Strikes plus upcoming demand add up to shortening supply . . .
See biggest squeeze in October . . . Kennecott Chilean strike may end soon
. . . September sales at high pace—By R. L. Hatschek.**

• SOME bright rays were shining in the copper situation late last week but the outlook is for a continuing tight market with the biggest squeeze coming in October.

For news of further copper developments see page 224.

Source of the brightness was a meeting of government, management and labor in Chile scheduled for last Friday. Object of the meeting, of course, was to end the strikes in Kennecott Copper Corp.'s Chilean mines and Anaconda Copper Mining Corp. Potrerillos mine. Also, the threatened walkout from Anaconda's Chuquicamata mine never came off.

September Deliveries Up

But the labor picture in domestic copper mines didn't seem to change a bit last week—Anaconda and Miami Copper Co. mines were still idle as the week ended. It did appear, however, that negotiators were getting closer together in the strike at Phelps Dodge Corp.'s El Paso refinery and that the strike might be ended in the near future. In the markets, meanwhile, inventory-shy consumers were coming in for heavier tonnages of copper and sales for September delivery now top 50,000 tons. Since the mine-to-market cycle for copper is about 60 days, the real pinch in supply won't come until next month—but the race for copper is already on.

Consumer Demand Healthy

What makes the outlook even more acute for the fairly short term future is that the auto industry will soon be done with its retooling for the 1955 models. And they'll be wanting plenty of copper and brass products quickly so they can get off to a flying sales start

with the new models in the fall.

The other two major copper consuming industries, construction and electrical, are also using copper at a healthy rate. Building is still booming, still holding its record pace. The electrical industry is doing well for itself, too, when compared with general manufacturing.

Copper and brass warehousemen report a steady climb in business which started about mid-July when many plants reopened after vacation shutdowns. Warehouses aren't singing about it yet—but it looks like the real thing, they say.

Brass mills are in somewhat similar circumstances—but here, too, labor is tightening things with strikes keeping some brass mill doors closed. The summer lull was a real one but the summer is over now and plants are starting up.

Copper:

Aim new drive at recapture of lost markets.

The copper and brass industry last week launched its new drive to fight off some of the inroads made by other materials during recent shortages and to eliminate from the public's mind many of the misconceptions about copper supply today and for the future.

Theodore Veltfort, manager of the Copper & Brass Research



Assn., said at a meeting last week that publicity and advertising has definitely been neglected in the past. This is to be remedied with an expanded program of research, gathering of statistics, advertising and general publicity "to acquaint the public with the applications of copper and its alloys."

Richard C. Diehl, president of Chase Brass & Copper Co. and of CABRA, briefly outlined a number of new uses for the ancient metal.

Combat Misinformation

One of the program's prime targets will be to assure industry that there are plentiful reserves of copper, that industry may use copper without fear of running out of the metal. Shortages during World War II and the Korean War are blamed for the existing doubt in industry minds. Aggressive sales programs of newer competing materials have also had their effect.

This and other aims of the campaign were outlined by Maubert St. Georges, promotional consultant retained by CABRA.

Another speaker was William A. Meissner, deputy director of Business & Defense Services Administration's Copper Div. He explained the functions of his agency and discussed a new quarterly publication "Copper Industry Quarterly Review." Considerable data is compiled in an attempt to reconcile differences of data from varying sources and give a clear, concise picture of the entire copper industry.

He summarized his agency's aims by saying: "We . . . feel it is our responsibility to foster the maintenance of a strong, healthy copper industry so that it can do a better job in normal times as well as in time of emergency."

SOVIET: Has Death Grip on Finland

Finland has undergone minor industrial revolution since 1944, but it is almost completely dependent on Russia for a market . . . Couldn't compete with West . . . This is part of Russia's long range strategy.

♦ WAR BETWEEN the U. S. and Russia is inevitable according to basic Communist doctrine. Even during World War II while fighting as our ally against the Nazis, the Russians were doing everything they could to prepare themselves for war against the U. S.

A small but significant part of this master strategy is Russia's dealings with Finland since 1944. There has been no attempt to make Finland an outright satellite but there has been a concerted and highly successful effort to bind Finland to Russia economically.

One reason the Russians have not attempted to take over Finland is that in event of World War III Finland, along with Sweden, would serve as a neutral barrier against the West, protecting Russia from both land and air attacks.

How The Squeeze Worked

By permitting Finland to remain out of the Communist orbit, Russia has also sidestepped the problem of having to weaken its armed forces by sending in occupation troops. In addition the Soviet can rely on Finland's industrial output in time of war and be fairly certain it will not be knocked out by enemy bombers.

The plan to make Finland economically dependent on Russia started with the peace treaty Finland signed with Russia in 1944. Terms of the agreement required Finland to pay reparations in industrial goods (for which Finland had extremely limited capacity) rather than in cash or its surplus timber products.

To supply the machine tools, vessels, power plants, furnaces

and other capital goods demanded by Russia, Finland had to get loans to build up its production facilities.

Result is that since 1944 there has been a minor industrial revolution within Finland, but it is almost entirely dependent upon trade with Reds.

Reason for this is that Finland would find it virtually impossible to develop other markets for its industrial goods. Lack of domestic minerals, high interest rates and stiff taxes make Finland a high-cost producer and on most industrial items it would be unable to compete with western producers.

Russia's Death Grip

This means that Finland is forced to rely on Russia as just about the sole outlet for its greatly expanded industrial capacity.

Under the recent 5-year trade treaty signed between Russia and Finland it is expected that shipments to the Soviet will account for about 40 pct of Finland's total exports. Almost all of this trade will be in industrial goods while in its commerce with the Free

World Finland's exports are mainly lumber products. This is the death grip Russia holds on Finland.

Shipbuilding: Maritime Administration allocates repair jobs.

Atlantic Coast shipyards are being asked to submit bids for repairing seven of the first 13 ships to be put in shape and returned to the mothball fleet under the new \$2 million ship repair program.

Maritime Administration, following a policy announced earlier, is giving 55 pct of the repair funds to Atlantic yards without regard to the actual number of ships repaired there. Pacific Coast yards will get two now and 16 pct of the total. Some 50 ships will eventually be repaired under the program.

Invitations will be issued in similar lots at regular intervals through February in order to achieve maximum continued employment in the shipyards, the Maritime Administration says.

Plan Engine Changes

Thirty shipyards are invited by Maritime Administration to bid on replacement of the 2,500-hp steam reciprocating engine in a Liberty ship with a 6,000 shaft hp steam turbine.

Award of the contract for this work probably will be made in early October (THE IRON AGE, Sept. 2, 1954, p. 62).

The ship to be converted is the first of four Liberties scheduled for experimental modernization. On this initial vessel, the bow will not be modified, and maximum use will be made of equipment now in the possession of the Maritime Administration.



PLANNING

Report To Management

Whether or not you think the cold war is getting hotter, this much is sure: it is definitely moving faster. And each move is intended to be disquieting to either the Free World or the rulers behind the Iron & Bamboo curtains. A look at the headlines will give you the drift.

"Russians Down Another U. S. Plane . . .
West Has Nothing To Fear From Communist China—Attlee . . . Formosa Steps Up Attacks On Invasion Coast . . . U. S. Set To Send Arms To Mid East . . . Bonn Shuns Paris In New Bid To Rerarm . . . Ease East Europe Embargo . . . Busy Peiping Impresses Attlee . . . Adenauer Cools On British Plans For 9-Power Talks . . . Accord Reached On Asian Treaty . . ."

It's a fact that the cold war has become global. You can expect trouble spots to multiply instead of diminishing. That's because neither side will overlook an opportunity to embarrass or worry the other.

This means that you may have to live with the cold war for 10 years or longer. It will have to be considered in most of the decisions you make. And the pushes and pulls of international diplomacy can make you look wise or otherwise on very short notice.

How should you operate in this kind of uncertain environment? One prospect is that the staff will assume more importance in management. Staff or committee will review or make more management decisions. The chief executive will still be of paramount importance. But he must have more information, more intelligence. This calls for specialists responsible to top management.

Another prospect is that decisions will tend to be less final. Company policy will have to be reviewed periodically, may be changed to fit changed conditions. Some of you already follow such procedure on sales, production, costs, etc. But an awful lot of your future is

wrapped up in what happens to your big creditor and customer—Uncle Sam.

Some of you have already learned to depend on top-flight representatives in Washington. Not for lobbying, but to be your eyes and ears, bird-dogging vital information.

If the international situation should "deteriorate" into another Korea-like police action, chances are your business may be much more able to swing into war production with a whiz-bang. Reason: development of "phantom" contracts for goods a firm could produce come full-scale mobilization. Big, medium and little businesses like yours are queueing up at Pentagon desks to get these hypothetical orders.

When "M" day arrives the paper they're written on becomes good as gold and pre-planned production operations get under way. Process enables defense agencies to timetable their needs, distribute the load equitably among best qualified producers.

Phantom contract system adds a synchromesh feature to gearshifting of the defense effort, makes for faster pickup and adds another "stop-and-think" item between Kremlin fingers and the trigger of the Soviet war machine.

Should the Democrats win control of Congress and not have a big recession drum to beat, there's a possibility of some McCarthy-like investigations into Eisenhower administration's so-called "coddling" of big business; tax relief, fast write-offs, other incentive measures.

You can bet that such investigations, launched from well-lighted, TV-covered committee rooms, would receive interest from politically-conscious labor groups, sensitive to unemployment distress areas, and disgruntled farmers unhappy over parity cutdowns.

INDUSTRIAL BRIEFS

Golden Anniversary . . . Pangborn Corp. held an Open House earlier this month in celebration of its 50th Anniversary at the Hagerstown, Md. plant.

New Office . . . Luria Steel & Trading Corp. moved its Boston office to 8 Newbury St.

Distributor . . . Chain Belt Co., Milwaukee, appointed Stevenson Machine Co. as a distributor of Chain Belt Products in and around Lockland, and Cincinnati, Ohio.

Completed . . . Weirton Steel Co., a division of National Steel Corp., has completed construction of a new blast furnace turbo blower and an extension of the open hearth mixer building, at its Weirton, West Va. plant.

Will Speak . . . Keith P. Rindfleish, will address the Chicago Chapter of the National Association of Cost Accountants on "Accounting Service to Sales," on Sept. 23.

Renamed . . . Kaiser Metal Products, Inc. has changed the name of the Aircraft Div. to Fleetwings Div.

Expansion . . . Northern Engineering Works, recently completed a building expansion at Chene & Atwater Streets, Detroit. It includes a new 20,000 sq ft assembly building, an addition to its existing structural fabricating area and complete new heating facilities.

Congrats . . . At the Annual convention of Pressed Metal Institute D. S. Harder, vice-president

of Ford Motor Co. was named as recipient of the first annual Presteel Award. The award was presented by Worcester Pressed Steel Co. which is sponsoring it in cooperation with the Institute.

Sales Rep . . . Elwell-Parker Electric Co., Cleveland, named The Frank L. Colker Co., Detroit, as its Michigan sales representative.

New Moniker . . . Cooper Alloy Corp. is the new name of the former Cooper Alloy Foundry Co., Hillside, N. J.

Dividend . . . Metal & Thermit Corp. declared a regular quarterly dividend of 50 cents a share on common stock.

Opportunity Knocks . . . Anthony L. Panzica, Buffalo, received the 1954-55 scholarship in metallurgical technology, established by Electra Refractories & Abrasives Corp., at Erie County Technical Institute, Buffalo.

Portable Welding Unit . . . Harvey Aluminum of Torrance, Calif., working in conjunction with Burdett Oxygen Co. developed a compact portable welding unit for light gas welding.

New Addition . . . Frederic B. Stevens, Inc., recently completed a new addition to the Springfield, Ohio, plant, which enabled the manufacturing operations to expand production of its complete line of automatic rack and automatic barrel plating and metal processing equipment.

"Electronic Brain" . . . A new high speed computer, the "electric brain," will soon be getting down to business in the offices of the National Tube Div., U. S. Steel at 525 William Penn Place, Pittsburgh. It will be the first installation in the metal industry and only the second industrial one in the U. S.

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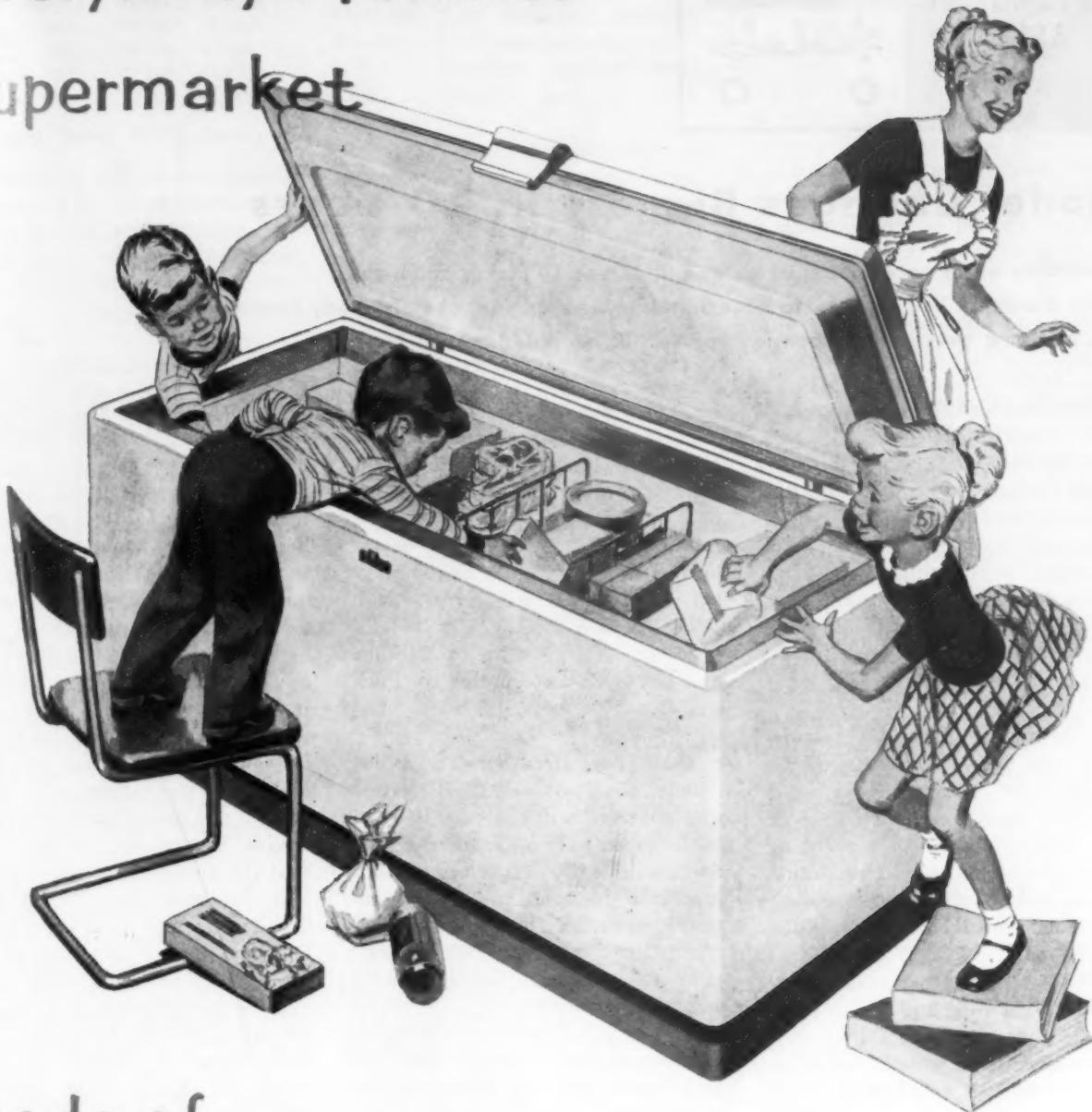
periodic replacement or repair. Will withstand elevated temperatures and abrasion.

- **VERSATILE . . .** can be sheared, welded or fabricated into all types of processing equipment, storage vessels. LECTRO-CLAD withstands any fabricating process that can be withstood by conventional rolled steel.

LECTRO-CLAD PIPE available in sizes from 1½" to 54" in diameter, 20-foot random lengths.

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AUTOMOTIVE
ASSEMBLY
LINE



Model Changes Biggest In 20 Years

Production of 54 cars almost at an end . . . Over 10 makes undergo major assembly line surgery to accommodate new engine, chassis, body tooling . . . Packard gets new suspension too—By R. D. Raddant

♦ AUTOMAKERS were busy last week throwing out the old and bringing in the new as the biggest model changeover in two decades paralyzed assembly lines.

Some of the largest tooling bills in history were being totalled up as new engine and body tooling replaced equipment that in some cases had turned out work for 20 years.

Get Complete Changes . . . A visitor to one of Chrysler's plants remarked that "everything in sight had been ripped out." All four of this company's lines are being completely redone. Production ceased last month on all lines of 54's. Some workers will be called back as early as Sept. 20 but production on the new cars isn't expected to get well under way until October.

Two cars that will get new engines as well as new bodies, Pontiac and Chevrolet, have started their changeovers. Pontiac closed down production last week and will not start on 55's until Oct. 4. Chevrolet has shut some of its parts plants, gear and axle, for example, and will stop assembly shortly.

Switch Two Engines . . . Pontiac has already replaced its old straight-8 tooling with its V-8 line and is turning out a token production of new engines. The fact that the new engine is being produced today on the very floor space where the old engine was made, and without any loss of production, indicates the planning that goes into a changeover.

Chevrolet will not scrap the old

six, but has added new engine manufacturing areas for the new V-8. It still hasn't been determined what percentage of Chevrolet production will be V-8, but it will probably start out at well below half, then work higher as the market is evaluated. With virgin floor space for V-8 tooling, Chevrolet's problem of setting up production has not been as complex as Pontiac's.

Take Short Breathers . . . Oldsmobile, with no basic body or engine changes, will close for 10 days in the latter part of October. Buick and Cadillac will close for similar intervals for the minor adjustments necessary for new grilles, stampings for front and rear end changes, and mechanical refinements.

If Ford is going to have its new models out in early November, some fast work will have to be done in Dearborn. Final runs are being made on 54's, but production has not yet slackened and cutbacks have not yet been observed to any significant extent.

Rework Ford Blocks . . . Reports indicate that the Ford engine has had a lot of reworking to bring its piston displacement up from 239 to 252 cu in. A lot of speculation has been going around to the effect that Ford would even revise its basic block. However, this is unnecessary, since the Ford block has the same external dimensions as the Mercury, which had 256 cu in. displacement for 1954. Basic transfer machines did not have to be replaced. But what about the Mercury? Its engine will require radical changes if it is going to increase horsepower to the extent that the market demands.

A lot has been heard about broadening the Ford line with a Fairlane model and adding both higher priced and lower priced cars to the Mercury line. This is not much of a problem because of the interchangeability of parts and body shells. There won't be any completely new lines although a lot can be done by playing around with the regular lines and adding distinctive features.

Incidentally, what happened to the Thunderbird, originally promised for late summer?

Packard Has Problems . . . Packard will get as thorough a changeover as any. This division of Studebaker-Packard has closed now for 60 days. The problems here are larger than in most other plants. A new engine line is being set up, changes are being made in the Ultramatic transmission, a new body plant is being reorganized, and final assembly operations are being shifted.

The highly publicized torsion



Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
Sept. 11, 1954...	70,170*	14,386*
Sept. 4, 1954...	93,775	17,220
Sept. 12, 1953...	103,387	19,476
Sept. 5, 1953...	110,852	21,722

*Estimated. Source: Ward's Reports

bar suspension will be introduced on Packard, a so-called secret that has been known in automotive circles for some weeks. The only speculation was that a second company might possibly have the same innovation.

It is more difficult to check the progress of Ford and Lincoln-Mercury changeovers. Each division performs only assembly operations, which can be changed in a hurry. The manufacturing is all done elsewhere in the vast organization of the Ford Motor Co. where operations are less open to public scrutiny.

Costs Never Revealed . . . Just how much all this costs is something that probably will never be known. Tooling costs are the industry's most closely guarded gems of information and even now public relations staffs are figuring out the best way to dodge the question.

At press previews, the question is always asked, never answered. At one model introduction a year or two ago, a new divisional manager permitted a round figure to slip out, then had a terrible time retrieving it.

As a result, some slipshod estimates usually occur, such as \$40 to \$50 million for a new engine line, more for a new body shell. Accurate figures would be a lot less misleading and less harmful in the long run and would be a valuable statistic for industry in general.

Ford Develops Jeep

Ford has completed design and development work on a new half-ton military vehicle that was to be disclosed to the public this week.

The \$2.5 million dollar contract for the development work for the vehicle was let in 1952. It is designated at the moment as the XM-151.

Comparison with the Jeep is in-

evitable and it also opens the way to speculation on the Jeep's future. Advance information indicates that the Ford unit has exceeded the Jeep in performance and durability, as might be expected from such a lengthy and thorough program.

However, no contracts have been let as yet and there is no indication at the moment whether or not the new vehicle would affect Willys defense contracts.

It is unknown at present whether Willys will concentrate on production of its new 750 lb. off-the-road Mechanical Mule or continue as primary Jeep supplier.

Machining:

Milling of blocks, heads may return, replace broaching.

A significant debate in tooling is sure to emerge along with the new engines that will be introduced in upcoming models. The issue is broaching against milling in machining of the surfaces of blocks and heads.

In recent years the tunnel broach has come into prominence in the mechanical handling of

AUTOMOTIVE NEWS

engine blocks and heads. This technique gained its greatest utilization at Ford and Dodge in particular of the Chrysler divisions. It was generally believed to have displaced milling in the trend to greater speed and more mechanical handling.

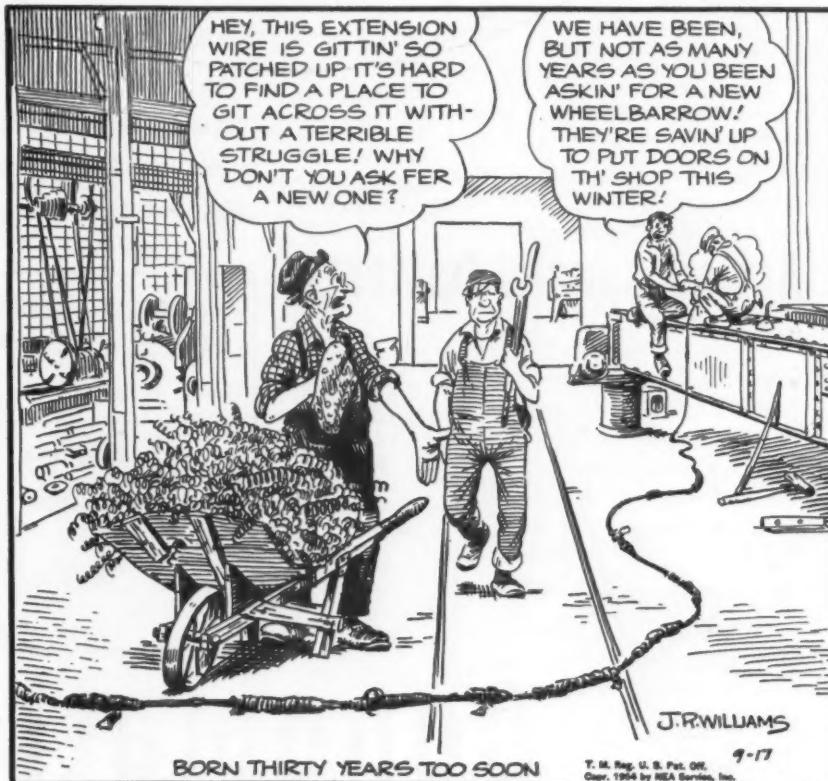
Uneconomic To Change

However, Cadillac, for example, has continued to mill block and head, although comparatively small production could have made it uneconomical to invest in the tremendous cost of the huge broaching machines.

But there is more than a strong hint that milling may be on the rebound, that different methods of engine manufacture and improved milling machines and techniques have revived milling. Don't look for any major milling of blocks, but heads and some other parts that have been broached in more recent engine tooling may have reverted to milling in at least one major instance.

THE BULL OF THE WOODS

By J. R. Williams



BORN THIRTY YEARS TOO SOON

T. M. Reg. U. S. Pat. Off.
Copy. 1954 by RIA Services, Inc.



Multiple spindle automatic builders do not deny the importance of good frame design. As early as 1920 Cone's revolutionary frame was substantial evidence that Cone did something about it.

For some time there has been discussion concerning the relative merits of the use of 100% carbide tooling on multiple spindle bar automatics. There has been very little information made available about successful carbide application to this type of machine by its builders or by carbide suppliers. But Cone is doing something about it.

The Conomatic Carbide Development program is accumulating much helpful information for "automatic" users through test runs under production conditions. The illustration is an example of such information applied to an actual production run. Full data is available.

Action speaks better



MATERIAL—ALUMINUM: Hole drilled with 1" and 1½" dia. drills to 1½" depth, and tapped to ¾" depth.

	HSS	CARBIDE
Cycle Time	90 secs.	11 secs.
Work Spindle Speed	270 R.P.M. at 104 S.F.	830 R.P.M. at 320 S.F.
Tool Wear	5,000 pcs. per grind	20,000 pcs. per grind

Conomatic }

CONE AUTOMATIC
MACHINE COMPANY, INC.
WINDSOR, VT., U.S.A.



Planners Seek Standby Control Law

Promise federal control won't be slapped on unless real war breaks out . . . Will avoid war—but not at all costs . . . Reds see how far they can push U. S. . . . What planners want—By G. H. Baker.

♦ THREAT of federal controls is real, but it won't materialize in the weeks ahead except in the event of shooting war.

The Eisenhower Administration is determined to avoid a war this year—but not at all costs. Any direct attack on U. S. territory would, of course, be met with swift and vicious retaliation. But involvement in a new foreign war is a political liability that the Eisenhower Administration can ill afford between now and the November elections. (Some top Democrats now concede sadly in private that one reason they lost the '52 elections was that their party had come to be known as the "war party.")

Reds Feel Us Out . . . It's generally agreed by members of both political parties that the Communists are now taking full advantage of the U. S. desire to avoid war. The Reds are getting "pushy," testing U. S. patience, trying to find how far they can go without being slapped down.

Note the new encroachments in the Indo-China peninsula, the shooting down of a U. S. aircraft in the Pacific, the shelling of Chiang Kai-shek's islands off the China mainland. These are not chance events. They are carefully planned demonstrations—displays calculated to intimidate free nations and to belittle U. S. might.

All this means that Administration planners are blowing the dust off the plans for imposing controls over prices, wages, products, and materials. They do not now have statutory authority to operate such

controls. But many of them believe the wise course to follow is to ask Congress next year for "stand-by" control authority. Give us the power to administer controls, they'll ask Congress. We promise not to impose controls unless absolutely necessary, they will plead.

What Planners Want . . . What they have in mind is winning from Congress the right to impose in time of emergency a 90-day freeze of all prices, wages, and rents. In addition, tight restrictions of products and industrial production would be extended. These controls would show up in two principal ways: Controls over inventories, and controls over end-uses.

What effect these control arguments will have on next year's Congress remains to be seen. It depends on many factors: Which party will control the Congress next year? Will the threat of hot war be close at hand? Will the Communists do a right-about and

accept Ike's offer to restrict rearmament and talk real peace?

Move on Plant Bias . . . Sponge out the color line in your plants, the Administration warns businessmen. In two new anti-discrimination moves, the White House (1) tightens up the non-discrimination clause which appears in all government contracts, and (2) calls on labor and management to help stamp out discrimination.

In the first of these two moves, President Eisenhower specifies that a conspicuous notice be displayed on the premises of all contractors doing business with the federal government, stating that the contractor is bound by a no-discrimination clause. In addition, each contract and subcontract must clearly prohibit discrimination in employment, upgrading, demotion, transfer, recruitment, pay rates and selection for training.

Since government procurement now accounts for about 12 pct of the gross national product in the U. S., the effect of the government's anti-discrimination campaign can readily be foreseen. If no-discrimination policies can be successfully enforced in the plants holding government contracts and subcontracts, the same philosophy probably will "rub off" on other companies, it is believed so that in time the color line may be wiped out throughout manufacturing.

Army School To Open . . . First class to attend the new Army Supply Management Course will begin its studies at Fort Lee, Va., on Oct. 11.

This graduate-level course for

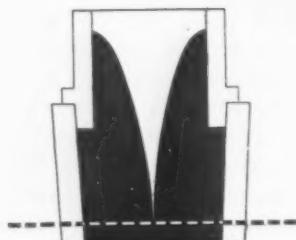
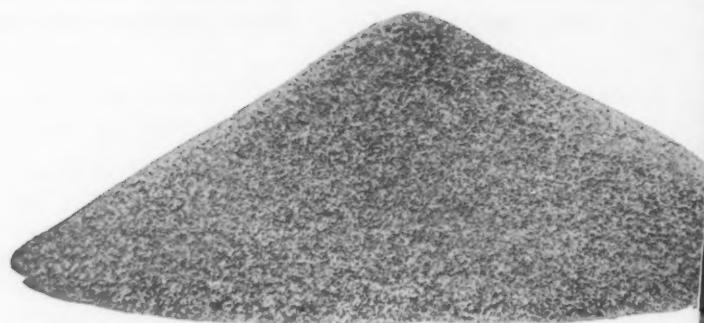
Push Trade Fairs

Plans to accelerate promotion of international trade fairs and exhibits as a means of increasing foreign business are being presented for industry's reaction by the U. S. Commerce Department.

Walter Williams, under-secretary of commerce, told a recent meeting of industry leaders that the Department will now act as a "focal point" for firms desiring to participate in international trade fairs. He also explained the services which are available to such firms.

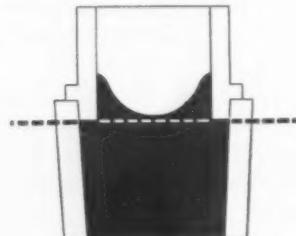
The Department is seeking suggestions on how to improve the program.

CUT CROPPING LOSS 20% TO 30%



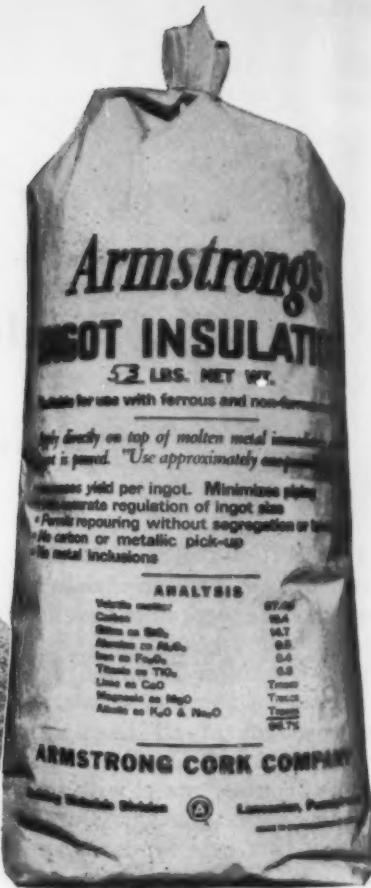
Without Armstrong's Ingot
Insulation

Large crop necessary because of too rapid cooling.
Result—deep penetration.



With Armstrong's Ingot
Insulation

Steel stays molten longer,
filling pipe as it forms. Result—smaller crop.



ARMSTRONG'S INGOT INSULATION retards solidification . . . reduces pipe penetration

You can increase the yield of steel per ingot by as much as 30% by using Armstrong's Ingot Insulation. Composed of carefully graded cork particles coated with a film of special clay, Armstrong's Ingot Insulation cuts your cropping loss by preventing deep pipe penetration as the steel cools.

By adding this highly efficient insulation after the ingot has been poured, you trap the heat in the hot top and prevent the steel from cooling too rapidly. The molten steel "feeds" properly, filling the hollow pipe as it forms, and eliminating the needless waste of deep pipe penetration.

Protected by their clay coating, the cork particles stay intact—are not consumed immediately by the heat of the molten steel. In fact, Armstrong's Ingot Insulation lasts until the ingot has solidified. The chemical composition of the ingot is not affected and there is no carbon pickup.

See for yourself how Armstrong's Ingot Insulation can help boost your steel production. Send for a free sample or have an Armstrong engineer help you conduct tests right in your own plant. For complete information, call your local Armstrong office or write Armstrong Cork Company, 2809 Susquehanna Street, Lancaster, Pennsylvania.



ARMSTRONG'S INSULATING REFRactories

senior officers and civilians in executive positions in the Army supply system is designed to provide integrated coverage of the entire supply process, from the manufacturer to consumer.

Included in the curriculum will be material on planning of requirements for current operations and for mobilization; management of procurement, maintenance, and distribution activities; disposal of excess stocks; and control of inventory and operating costs.

Harbridge House, Inc., of Cambridge, Mass., is preparing the instructional material and has completed a manual for use as a text in the 12-week course. The firm specializes in development of management training matter for the government and industry.

Making up the first class for the new course, to be taught by Harbridge House, will be 35 officers and civilians. Of this group, 15 will be assigned to take over the job of instruction, beginning with the second class.

List Pollution Controls

Measures for combatting air pollution—the subject of intense research by industrial and municipal laboratories—cost up to \$120 million annually, U. S. Bureau of Mines reports.

The Bureau has compiled a bibliography listing more than 3900 references on various aspects of air pollution, including nature and origin; effects on health, materials and structures; methods of determination and control; and costs in damage by pollution.

This document, *Air Pollution, A Bibliography* is designated officially as Bureau of Mines Bulletin 537. It may be bought only from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., for \$1.75 a copy.

Cut Grain Storage

Grain storage structures will be bought by the government at a reduced rate during the remainder of 1954.

Heavier selling of surplus grains and effects of the summer drought have decreased the need for added bin space. Recent awards of contracts for bins which will hold

some 6 million bu bring to 844 million bu the total surplus-grain storage capacity owned by Commodity Credit Corp.

WASHINGTON NEWS

Locomotives:

Stassen splits aid orders between U. S., foreign firms.

A \$13 million shot-in-the-arm is given to distressed U. S. railroad, locomotive, and car manufacturing industry as Foreign Operations Adm. director Harold E. Stassen announces he will split contracts on railroad equipment for India.

Key factor in Mr. Stassen's decision to split the work about 50-50 between low-bidding foreign firms and American companies whose bids on the average doubled those of their foreign competitors, is the plight of the American railroad equipment industry.

Up Cost \$7 Million

Mr. Stassen, who expects his decision to draw criticism both here and abroad, will give contracts for about 50 locomotives to the Baldwin-Lima-Hamilton Corp., Philadelphia, and another 50 to a Japanese firm who submitted the low bid. About half of the 5000 freight cars in another contract will be built by three U. S. firms seeking the work. Plan will exceed the original estimated cost of \$20 million by \$7 million.

Mr. Stassen said plan does not represent a new pattern for awarding future contracts and that FOA

will go back to a "world-wide" basis when the U. S. economy picks up.

Heads Mfg. Committee

Roy C. Ingersoll, president of Borg-Warner Corp., Chicago, is the newly-named chairman of the U. S. Chamber of Commerce Manufacture Committee for 1954-55.

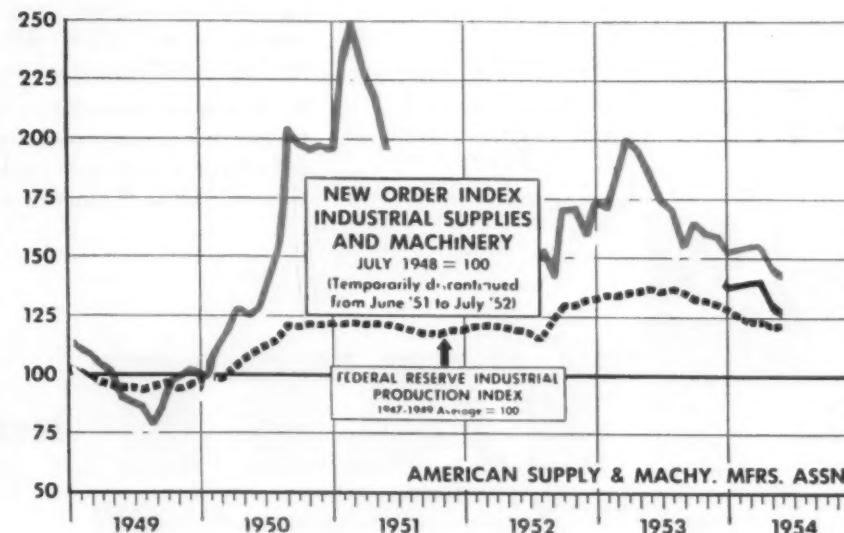
Represented in the 47-member group are executives from both large and small manufacturing firms in 22 states. This committee will advise officers and directors of the Chamber concerning manufacturers' views on policies and programs of the organization.

Working with other groups, the committee plans to give attention to such issues as taxation, labor relations, economic education, and foreign trade.

Study Freight Schedules

Suspended and now being investigated by Interstate Commerce Commission are proposed tariff schedules offering new rail volume rates on l.c.l. shipments of 5000 lb and over, to apply between Eastern and Central Freight Assn. points.

These schedules were to have become effective on Sept. 4. Their use is deferred through next Apr. 3, pending further word from ICC on new rates.

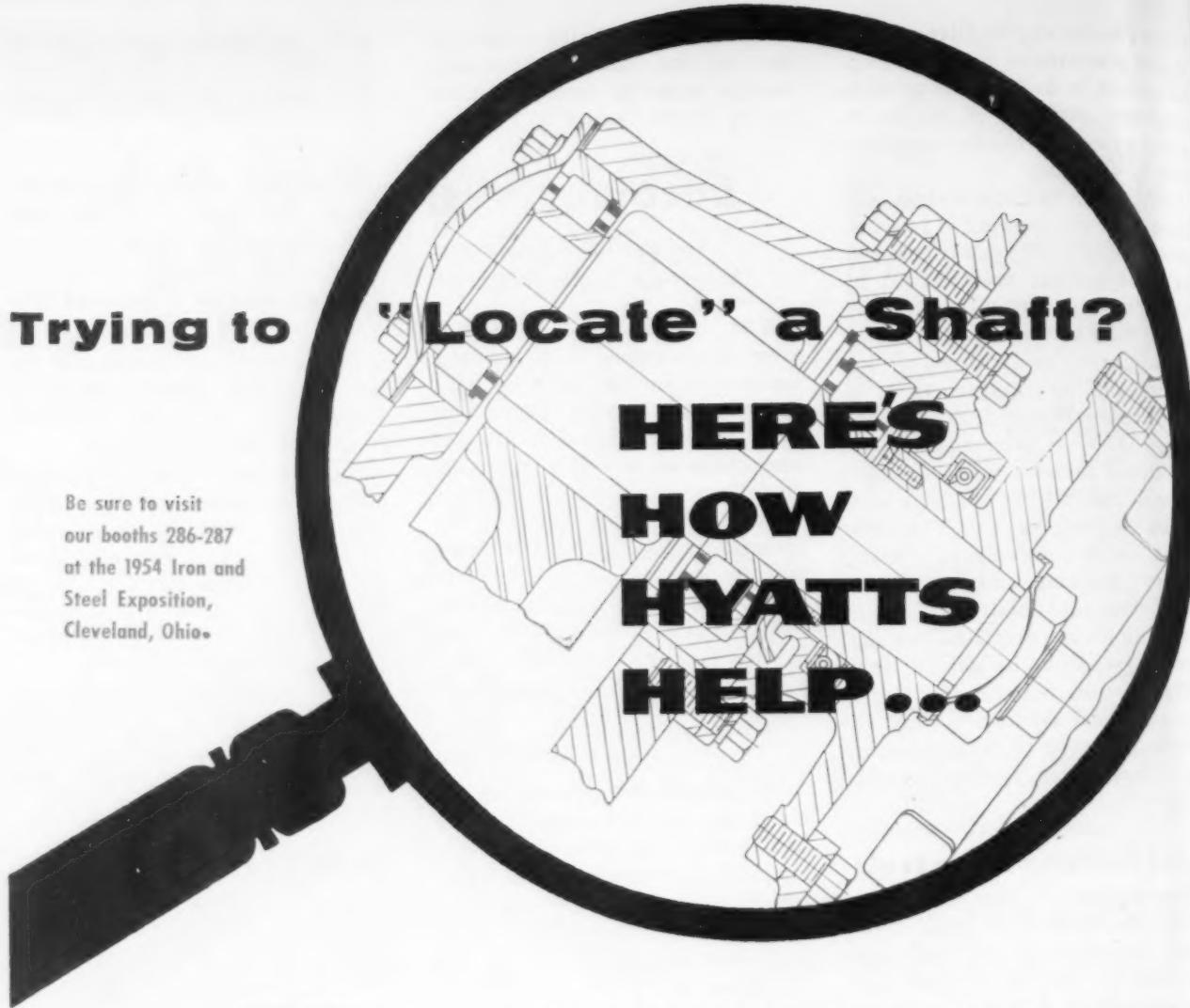


Trying to

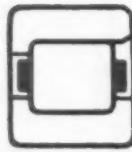
Be sure to visit
our booths 286-287
at the 1954 Iron and
Steel Exposition,
Cleveland, Ohio.

"Locate" a Shaft?

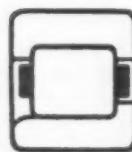
**HERE'S
HOW
HYATTS
HELP...**



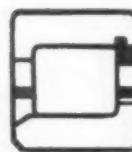
3 TYPES



BU-L
separable
outer race
series



R-WB
separable
inner race
series



R-YB
separable
inner race
series

Shown in section at the left are three Hyatt Hy-Load Bearing types that are used for axial shaft location. Flanges on inner or outer races limit axial shaft movement and permit the bearing to take light, intermittent thrust loads.

Since Hyatt inner races are assembled on shafts, with relatively heavy press fits, no accessory parts are necessary to hold them in place.

Hyatt Hy-Load Bearings are available with a variety of combinations of race flanges, snap rings, cages or separators, so that just the right combination can be selected for each set of operating conditions.

Hy-Loads are available in three diameter series, two widths and a complete range of sizes. For complete information write for Catalog 150—Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey.

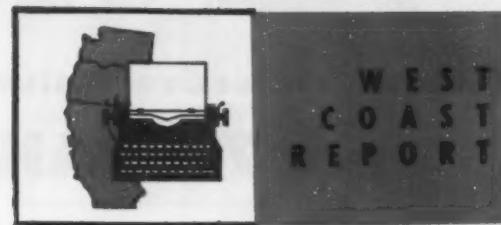
HYATT

STRAIGHT

BARREL

TAPER

ROLLER BEARINGS



Tap Alaska's Power, Mineral Wealth

Wood Canyon power project start of 7 billion kw-hr Alaskan development program . . . Would rival Grand Coulee . . . Low cost energy will permit mining, refining of aluminum, copper . . . Seek iron ore too—By R. R. Kay.

♦ FIRST major harnessing of energy in Alaska's roaring river canyons would be an open-sesame for vast electro-metallurgical and electro-chemical industries in the territory. Tremendous metal and mineral wealth is known to be locked in Alaska's ground: power is the wedge needed to pry it loose.

Harvey Aluminum, Inc., Torrance, Calif., a Federal Power Commission preliminary permit in hand, has taken another step ahead in a \$350 million 7-billion kw-hr a year hydroelectric project and metals development program.

This could well open new industrial frontiers in Alaska with a rush that would make the Klondike days look like a Sunday-school picnic. Probably the largest privately financed engineering project in the world, the dam's power output would rival Hoover and Grand Coulee.

Plan 1.1 Million Kw . . . Harvey is exploring a site at Wood Canyon, 85 miles up the Copper River in the Valdez area, south central Alaska. Plans call for a 560-ft high dam with crest length of 1750 ft, and a powerhouse with 1.1 million kw ultimate installed capacity. Three years and \$3 million may be required to prepare for final FPC license.

"The industrial development of the U. S. has proceeded so rapidly that in metals and minerals this country gradually is becoming a 'have not' nation. Through development of Alaska's resources many minerals and chemical ores now imported could be produced there," Executive Vice-President Law-

rence E. Harvey said in an exclusive interview with THE IRON AGE.

What are potential uses of Wood Canyon power? Harvey's application to FPC lists uses for 5.3 billion kw-hr and 740,000 kw of capacity.

Aluminum Major Consumer . . .

Aluminum ingot production would be the principal use, consuming 1.8 billion kw-hr. 50-100,000 tons annually of primary magnesium would need one billion kw-hr.

Sodium metal and sodium compounds, now costing about \$58.20 a ton for energy alone, could be reduced \$37.50 per ton with cheap power, enough to offset the transportation handicap. Production estimates of 100 million pounds annually, roughly half of current U. S. production, would absorb 520 million kw-hr per year.

Orange Hill ore body, well known to mining companies for its

estimated \$2 billion in mineable ores, is only 125 miles north of the Wood Canyon power plant site. Mining the low grade deposits of copper, molybdenite, gold, and silver would require a minimum 750 million kw-hr per year.

And only 190 transmission miles away is the power hungry Anchorage-Railbelt area which might readily use one billion kw-hr.

Mr. Harvey believes that the entire potential output, 7 billion kw-hr, could be fully utilized within 20 years.

Seek Alaskan Iron . . . Alaska a new iron industry frontier? U. S. Steel Corp. geologists were reported searching for Alaskan ore. Now a million-dollar Canadian corporation expects to mine, drill, concentrate, refine, process, and market Alaskan ore. Quebec Metallurgical Industries, Ltd., a Frobisher interest, organized Klukwan Iron Ore Corp. to develop the Klukwan deposits, claimed the largest remaining undeveloped on the North American continent, with geologists' estimates running to 13 billion tons.

The City of Seattle has an FPC 3-year preliminary permit to build a hydroelectric project on the Pend Oreille River, Wash. Plans call for construction of a 300-ft high dam.

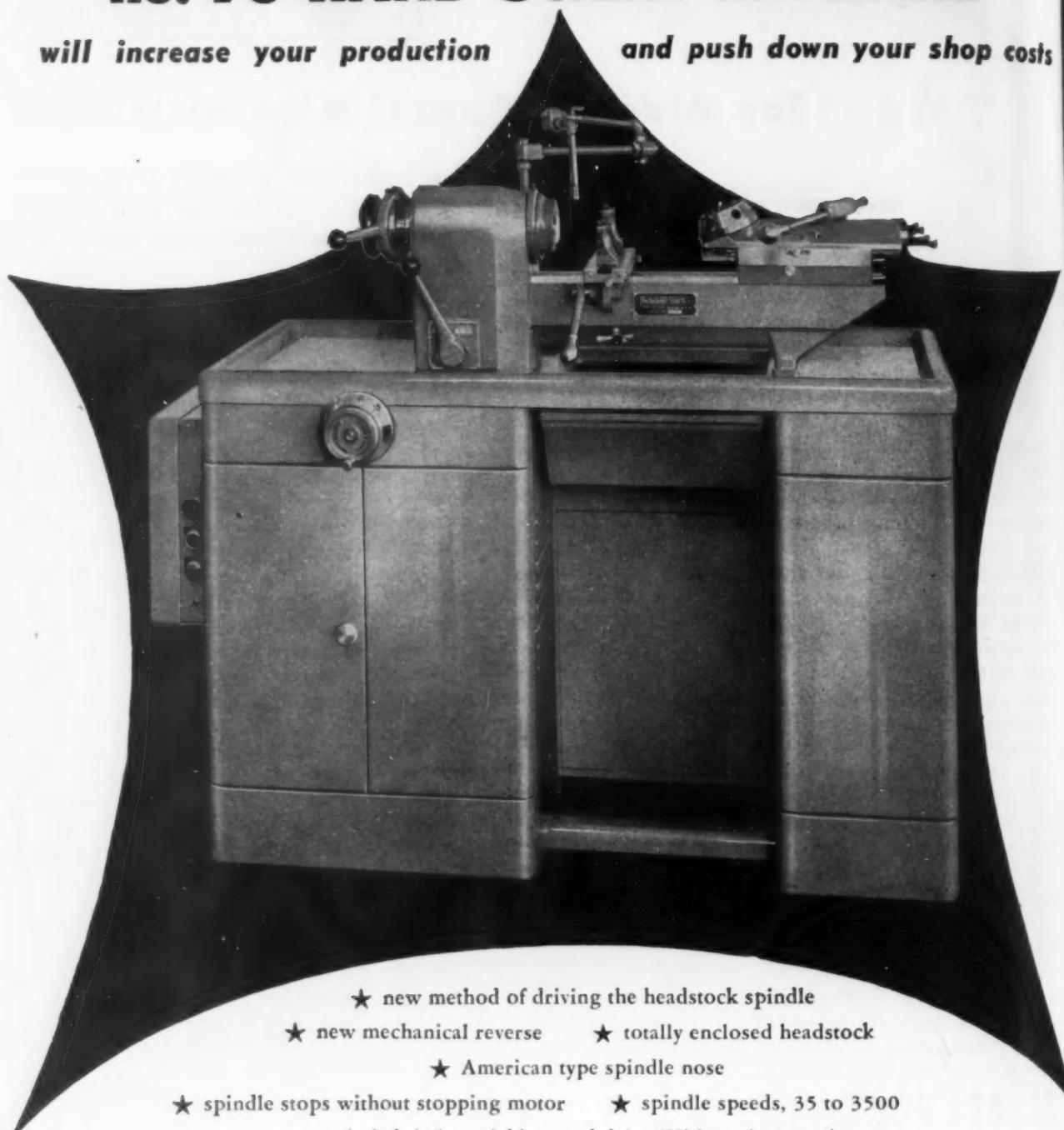


Make Own Cans . . . Are big cannery going in for making their own cans? . . . Dole Hawaiian Pineapple Co., Ltd., will build a \$3 million plant to produce 300 millions cans per year. Adjoining its Honolulu cannery, it is scheduled for completion in 1956.

A "natural" for the ELECTRONICS Industry . . .
 these impressive features on the brand new **Wade**
no. 73 HAND SCREW MACHINE

will increase your production

and push down your shop costs



- ★ new method of driving the headstock spindle
- ★ new mechanical reverse ★ totally enclosed headstock
- ★ American type spindle nose
- ★ spindle stops without stopping motor ★ spindle speeds, 35 to 3500
- ★ infinitely variable speed drive (Hi-lo ratio 5 to 1)
- ★ hardened and ground bed ★ reverse ratio 2½ to 1 ★ single lever control
- ★ single speed motor ★ built-in coolant pump
- ★ new pedestal cabinet with built-in chip pan and collet rack for 36 collets

Send for descriptive circular on the WADE NO. 73 HAND SCREW MACHINE

THE WADE TOOL CO.
 WALTHAM 54, MASS., U. S. A.

Address:
 60 River Street

MAKERS OF
 PRECISION TOOLS FOR
 AMERICAN INDUSTRY



Need Built-In Accessory Mounts

Aircraft industry, others seek attaching pads, bosses for machines . . . Would facilitate interchange of special applications, hydraulics, motions on standard tools . . . Unveil new leasing plan—By E. J. Egan, Jr.

• "WE (machine tool) users feel that there is a definite need . . . for attaching pads, machine bosses or risers on the sides of the machines . . . so that future applications of hydraulic and other motions can be applied to standard machine tool equipment in the growing industry of today."

This appeal to machine tool designers and builders was tossed into the discussion at the recent Production Machine Tool Hydraulic Forum sponsored by Vickers, Inc., Detroit manufacturer of hydraulic equipment. Spokesman was Paul Walla of the Wright Aeronautical Div., Curtiss-Wright Corp., Woodridge, N. J.

Seek Hitching Posts . . . Mr. Walla's plea for these mechanical "hitching posts" was made "so that aircraft industry users of standard machine tools can avail themselves of the mechanisms and hydraulics now at hand to perform semi-special or special machine applications."

It is not necessary to build a special machine each time to achieve a certain added motion, Mr. Walla maintained. But it is very handy to have a machine pad relative to the centerline of the machine spindle, bolster plate, platen, table or other standard dimension of a known value, he said.

Cut Engineering Costs . . . Idea is that these well-located, built-in attachment areas would make it simpler and cheaper to engineer and apply accessories for added motions as required. If the aircraft industry bought special machine tools for all new products in the

pilot development stage, the product cost would be prohibitive, Mr. Walla asserted. But to escape this cost problem, the industry runs right into another one.

Aircraft plants manage to get their machine bosses or pads for special new product machining attachments, but the gain is achieved only at high manpower expense.

"After all," the speaker concluded, "we are the customer and when you pay \$30,000 or \$40,000 for a machine, an added \$1500, \$500 or \$250 for bosses, adequately placed, is well worth the price."

Reveal Leasing Plan . . . It may take awhile before machine tools on lease represent any sizeable proportion of metalworking equipment in U. S. factories. But the very announcement of formal leasing plans by a machine tool builder seems to act as a sales stimulant.

Just about two months ago Jones & Lamson Machine Co., Springfield,

Vt., announced a marketing tie-up with C. I. T. Corp., one of the major industrial financing concerns. Object was a neatly packaged three-way machine tool marketing service. Prospective customers have their choice of 1) an outright purchase, 2) buying on a low interest rate installment plan, or 3) leasing equipment for periods up to 9 years.

News items and advertisements about the J. & L.-C. I. T. plans played heavily on a couple of popular themes. They emphasized the much publicized facts that capital equipment in American factories is fast becoming obsolete, and that rapid technological progress makes new equipment a must for meeting low-cost foreign competition.

Results Gratifying . . . Results of the optional marketing service idea have been very pleasing to J. & L.'s management. Curiosity apparently prompted a surprising number of prospects who stopped to look at the leasing plans and stayed to buy new machine tools.

Biggest play went to J. & L.'s "pay-from-productivity" option, designed to allow buyers to finance their purchases out of the savings created by the new equipment. After a nominal down payment, balance of the purchase price can be handled in equal monthly installments over a 1 to 5 year period.

J. & L.'s experience has closely paralleled that of Kearney & Trecker Corp., Milwaukee machine tool builders who announced a comprehensive tool leasing program early this year. Both firms have done a healthy amount of business with first-time customers of undeniably sound credit rating.



"Just as I figured—off .005."

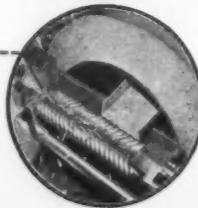
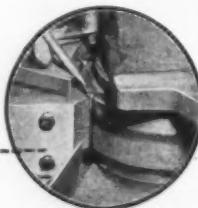
Another big Waterbury Farrel change in the screw production picture...

THIS NEW WF MACHINE THREADS 300 TO 1800 SCREWS PER MINUTE



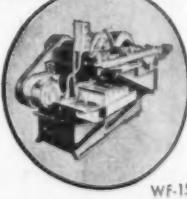
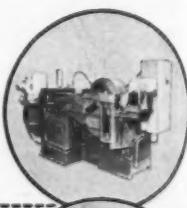
Waterbury No. 1 High Speed Threader

- Capacity: #6 to $\frac{1}{4}$ " machine screws— $\frac{5}{16}$ " to 3" long—Steel, brass and other alloys.
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The Iron Age

S A L U T E S



Leonard S. Hobbs Won the Collier Trophy, highest award in aviation, because he had the courage to shoot an engineering curve right off the graph—and make it work.

THE IRON AGE salutes Leonard S. Hobbs for winning the 1953 Collier Trophy, aviation's top award. But behind that simple fact is one of the most fascinating stories we've heard.

"Luke" Hobbs is by no means an ordinary man. Yet he is such a regular guy that he charms people wherever he goes. Perhaps what interests us most is that he has the courage to shoot an engineering curve right off the graph. That's how the 57-year-old vice-president for engineering for United Aircraft Corp. came to win the Collier Trophy.

After turning out piston engines powering 50 pct of our aircraft during the last war, Pratt & Whitney Aircraft found itself starting from scratch on jets. The difficult assignment of leapfrogging 5 years of competitive advantage was given to Luke.

At that time jet engines in service were rated at about 4000-lb thrust. And on the drawing

boards of most of P&WA's competitors were engines in the 6000- to 7000-lb class.

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Luke does most of his work with an ancient mechanical pencil that sometimes refuses to function at all. When not at work, he plays golf with enormous concentration and mediocre results.

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KAOSIL, having an added margin of the particular, beneficial properties of semi-silica fireclay brick is a truly unique refractory. The enhanced physical and chemical properties of KAOSIL extend the range of usefulness of the highly siliceous type of fireclay refractories.

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KAOSIL is made from exceedingly fine grained siliceous kaolin of exceptional purity and uniformity. Its silica content is approximately 75 percent and its content of basic oxides of alkalies and alkaline earths is phenomenally low—less than 1 percent.

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Purity in composition of KAOSIL accounts for its high refractoriness and high temperature of vitrification.

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THE IRON AGE

PERSONNEL

The Iron Age INTRODUCES

F. L. Riggan, Sr., elected president of Sheet Aluminum Corp., Jackson, Mich.

W. L. Fabianic, elected vice-president in charge of research and quality control, Lacledo-Christy Co.; and **P. K. Nichols**, elected vice-president in charge of operations.

Robert L. Earle, becomes vice-president — Administration and assistant to the president, Marquardt Aircraft Co., Van Nuys, Calif.

John D. Russell, elected to vice-president — Engineering, Joy Manufacturing Co., Pittsburgh.

Erwin H. Graham, appointed comptroller, DeSoto Div., Chrysler Corp., Detroit.

Richard T. Orth, becomes vice-president, Electronic Tube Div., Westinghouse Electric Corp.

N. E. Wenzel, elected vice-president in charge of operations, Globe Steel Tubes Co., Milwaukee.

Bruce E. Ellithorpe, appointed director of advertising and public relations, Axelson Mfg. Co. Div., Pressed Steel Car Co., Inc.

C. Nelson Wetherell, appointed manager of training and education, Joseph T. Ryerson & Son, Inc., Chicago; and **Richard J. Oetting**, named office manager, Chicago plant.

Marvin M. Ramer, appointed manager of sales promotion, Blaw-Knox Co., Chemical Plants Div., Pittsburgh.

Charles W. Bowden, Jr., appointed market extension manager, Industrial Div., Minneapolis-Honeywell Regulator Co.

Jack G. Fleming, named acting manager, Winter Garden, Fla., plant, Continental Can Co.

R. E. Nordstrom, transferred to Los Angeles, Baldwin-Lima-Hamilton Corp., Philadelphia.

Joseph P. Costigan, named works manager, Buffalo plant, American Machine & Foundry Co., New York.

Harris C. Miller, promoted to New York district sales manager, Hooker Electrochemical Co., Niagara Falls, N. Y.

J. P. Moran, appointed building wire specialist, in charge of its national sales program for aluminum building wire, Kaiser Aluminum & Chemical Sales, Inc.

Thomas J. McCue, appointed district manager of sales, Philadelphia territory, Wyckoff Steel Co.; and **John C. Hornberger**, named assistant manager sales, Newark, N. J., headquarters.

Albert W. Agnew, appointed district manager, Vickers Inc., El Segundo and Berkley, Cal., field offices.

J. H. Swisher, appointed district sales manager, Cincinnati sales office, Weirton Steel Co.

D. L. Rossiter, named sales manager, Engineering Products Div., Inland Steel Products Co., Milwaukee.

JOHN P. RICHMOND, elected vice-president-Finance, ACF Industries, Inc., New York.



JACK J. TIMPY, elected vice-president, American Motors Corp., Detroit.



H. B. PLUNKETT, elected executive vice-president, A. P. Green Fire Brick Co., Mexico, Miss.



ROBERT S. BUBB, named director of market research, The American Brake Shoe Co., New York.



R. Gurdan Miller, promoted to district manager, Michigan, The Parker Appliance Co., Cleveland.

B. J. Riggs, appointed general traffic manager, Behr-Manning Corp., Troy, N. Y. He succeeds Harry N. VanAntwerp, who has retired after 41 years of service.

Heinz Pagels, appointed general manager, Virginia Metal Products' Manufacturing Div.

Forrest F. Hinkley, appointed general manager, Aero-Coupling Corp., Burbank, Calif.

Ralph F. Hornbach, named general manager, newly-created Special Products Div., Geo. D. Roper Corp., Rockford, Ill.

Bruce A. Yates, named assistant product manager in charge of welded tubing sales, Kaiser Aluminum & Chemical Sales, Inc., Chicago.

Paul R. Simon, appointed general manager, Scrap Iron Div., Gary Steel Supply Co.

Bernard L. Ward, appointed assistant chief engineer, The Fellows Gear Shaper Co., Springfield, Vt.

Philip O. Geier, Jr., appointed sales manager, Cincinnati Milling Products Div., Cincinnati Milling & Grinding Machines, Inc.

Jack Selway, appointed blast furnace superintendent, Chester Blast Furnace, Inc., a subsidiary of Barium Steel Corp.

G. D. Partridge, transferred to the Detroit district as manager, International Harvester Co., Chicago.

Charles E. Windhovel, Jr., appointed sales representative in the Central New York State area, Vanadium-Alloys Steel Co.

Earl J. Clark, appointed general sales manager, Set Screw & Mfg. Co., Bartlett, Ill.



ORRIN E. BARNUM, appointed treasurer, U. S. Steel Supply Div., Chicago, U. S. Steel Corp.



BYRON L. SMITH, promoted to manager, Market Development Dept., Continental Steel Corp.

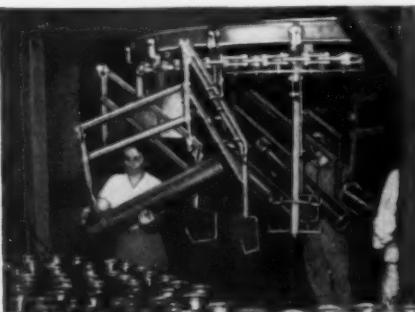


CHARLES M. WELLONS, named abrasive engineer, Philadelphia district office, Norton Co.



JOHN C. HARDEN, joins the Industrial Sales and Service Staff, Wyandotte Chemicals Corp.

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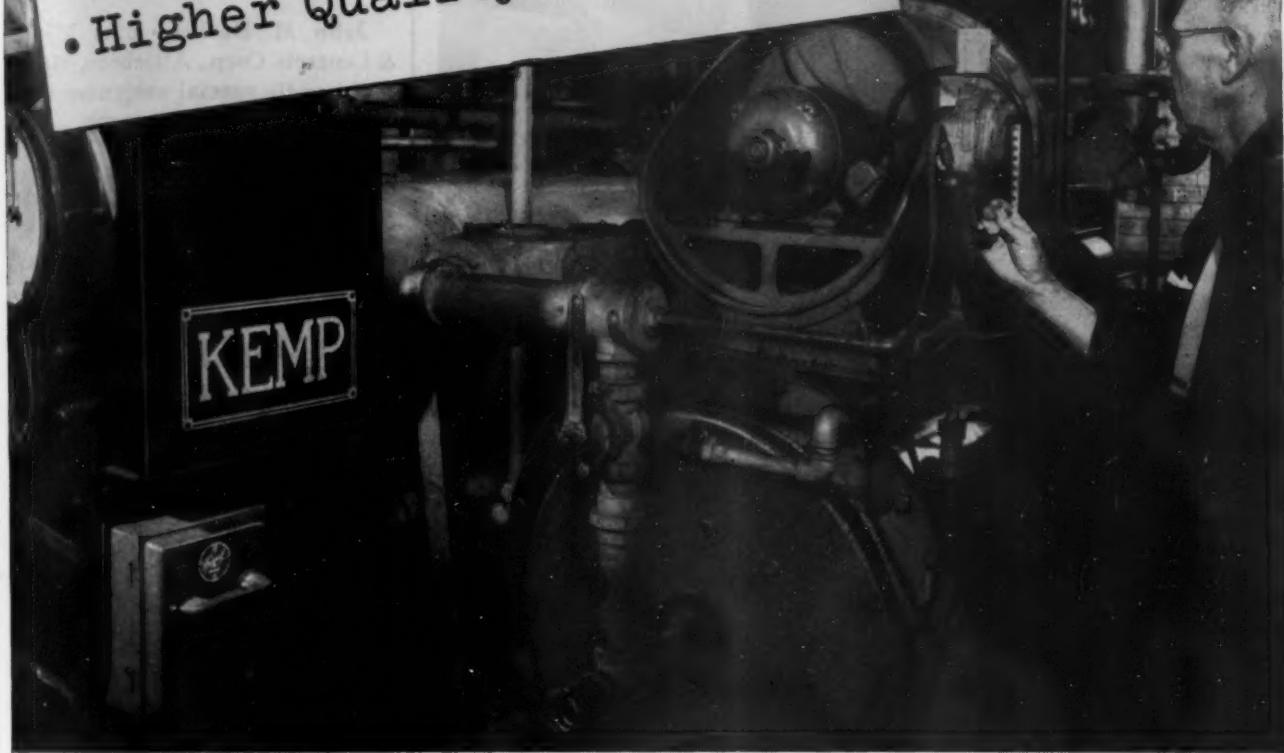
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Twin Kemp Atmos Gas Generators Give This Steel Producer Absolute Atmosphere Control

Preventing oxidation and discoloration during the annealing of cold strip steel is the assignment of two Kemp Model 6-MR Atmos Gas Generators installed at Thomas Strip Division of Pittsburgh Steel. The picture shows Fred Michaels, Turn Foreman, observing the test burner on the panel of the controlled atmosphere producer.

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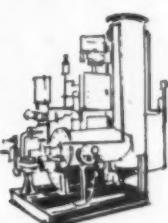
they replaced. Purity of the gas is very good by actual analysis . . . equipment capacity increased . . . maintenance and labor costs reduced . . . product quality improved by the much closer atmospheric control made possible by Kemp.

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General Box

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Vern R. Halter, appointed general superintendent, all Liquid Carbonic Gas Plants, The Liquid Carbonic Corp., Chicago.

E. C. Graves, named superintendent of product manufacturing, General Electric Co., Detroit.

John M. Durkee, joins Metals & Controls Corp., Attleboro, Mass., will handle special assignments in market and sales research.

Fred K. Landgraf, appointed pig iron sales representative, Chicago sales district, Republic Steel Corp.

James R. Bossone, appointed a district representative to handle construction materials, Philadelphia area, General Electric Co.

George W. Overstreet, appointed sales representative, North and South Carolina and portions of Tennessee and Georgia, Wolverine Tube, Division of Calumet & Hecla, Inc.

Tom Jewell, Jim Collins, Deane Treat, Ray Tippett, Jerry Plant and Henry Kozlowski, became sales engineers, Chain Belt Co.

Joseph F. Janecke, joins the Chicago Vitreous Corp., Cicero, Ill.

OBITUARIES

Ben F. Campbell, vice-president of Alabama Dry Dock & Shipbuilding Co., recently in Mobile, Ala.

Elmer J. Tompkins, metallurgist, Central Steel & Wire Co., at his home in Illinois recently.

W. Porter Golden, 64, associated with the seamless tube industry for almost 38 years, was assistant to the general manager of sales, Spang-Chalfant Div., The National Supply Co.

TECHNICAL
ARTICLES**More design freedom—**

Fabricator Lowers Tooling Costs, Improves Productivity, Through Wide Use of Stud Welding

By J. W. Jones, Chief Methods Engineer, Barry-Wehmiller Machinery Co., St. Louis

♦ Productivity has been nearly doubled while simultaneously reducing tooling investment by as much as 65 pct through the use of stud welding for the fabrication of large, automatic bottle washers, labeling machines, pasteurizers and food processors.

♦ A pioneer in the large scale use of stud welding, Barry-Wehmiller Machinery Co. uses 1800 to 2000 stud welds in its high production bottle washing machines that are shipped knockdown all over the world . . . Virtual elimination of troublesome corrosion problems, simplified assembly and ability to use less expensive jigs and fixtures are further advantages of stud welding.

♦ Both plain carbon and stainless studs are specified . . . Many drilling, tapping and punching operations are eliminated . . . Accuracy of assemblies is closely held by ingenious use of templates.

♦ STUD WELDING was adopted by Barry-Wehmiller Machinery Co., St. Louis, after an extensive investigation as offering perhaps the best available opportunity for a metal fabricator to reduce production costs while simultaneously improving the quality of the product. Economies effected may be conveniently classified as follows: (1) Simplify the operation and speed up production, (2) elimination of expensive tooling equipment, (3) improve flexibility of design as well as the quality of the product, (4) reduction in labor cost.

Compared with the previous methods of drilling and tapping or punching, stud welding offers a much simplified process. In addition to the elimination of costly drilling and press equip-

ment, the use of stud welding completely eliminates the need for hundreds of washers and seals on each unit. Since virtually all drilling is eliminated, the possibility of leaks around bolt-holes has been removed. The significance of this gain becomes more apparent when it is recalled that 1800 to 2000 stud welds may be made in fabricating a single bottle washing unit.

Savings in tooling investment are equally impressive. Recent cost studies show that the purchase of 6 studwelders would eliminate the need for 6 drill presses and 3 additional punch presses. Estimated savings in capital equipment was \$50,000.

Reduce fabrication time

In addition to reductions in the time required to fabricate a washing or pasteurizing unit averaging 80 to 100 pct, new freedom in design has been achieved. Tanks are now ordered without specifying any pre-drilled holes in plates. This has resulted in improved delivery of fabricated tanks.

Ability to use light, portable welding equipment has made it unnecessary to move bulky, heavy assemblies. Of equal importance is the fact that a trained welder is not required. A responsible shop man who follows instructions can be trained in a few days to do a highly satisfactory stud welding job.

Weight of assemblies has been substantially reduced. Leaks and subsequent rework have been eliminated.

Design and fabrication of large bottle washers and cleaners, pasteurizers, automatic labeling machines and food processors is essentially a job shop operation. Each unit must be designed to fit a specific job.

Capacity of the equipment, distribution of cleaning medium or an operation bi-product (ranging from strong basic solutions and mild acids to steam heated liquids up to 200°F.) must be carefully planned for each job. Opportunities

"Studs incorporate a deoxidizing agent in the flux which is contained in the stud end . . ."

to standardize are largely confined to auxiliary units like pumps, fitting, flanges, brackets, etc. The large metal tanks required are custom fabricated by outside suppliers.

Electric arc stud welding is a process of joining metal surfaces using an electric arc as a source of heat. In this process, the stud is the electrode. The stud gun serves as the electrode holder.

To perform the operation, the stud is placed in a spring-type chuck on the end of the welding gun. A porcelain ferrule serves as an arc shield. With the ferrule in place, the operator places the stud gun against the work plate. With the stud held in the desired position, the operator closes the trigger switch in the handle of the welding gun.

Control welding time

The stud is automatically retracted from the work approximately $1/16$ in. and held there for a controlled period of time. The electric arc developed between the stud and the plate forms a molten pool of metal which is held in place by the ferrule. The ferrule also (1) shields the arc, (2) prevents oxidation of the weld metal, (3) concentrates the welding heat, (4) forms a fillet around the base of the stud.

Welding time and amount of electric current is carefully controlled. Elapsed time may vary from a fraction of a second for studs $1/8$ in. diam to 1 sec or more for large studs. Studs up to $5/8$ in. diam are being used at Barry-Wehmiller. Capacity of the Lincoln-Nelson welder is 800 amps.

In day-to-day operation it is possible to center punch the plate, plate the ferrule in position, and make 2 welds in as little as 3 min.

Most of the studs employed by Barry Wehmiller are round although square or rectangular studs are commercially available.

Preheat to avoid brittleness

Studs purchased from Nelson Stud Welding Div. incorporate a deoxidizing agent in the flux which is contained in the end of the stud.

Weld strength is equivalent, with few exceptions, to the strength of the materials being joined. Preheat or post heat treatments may be used, if necessary, to avoid brittleness in the heat affected zone.

Most of the plate employed by Barry Wehmiller is in the range 0.10 to 0.25 pct C. Both plain carbon and stainless studs are used. Stainless studs may be joined either to stainless plate or to carbon plate.

Plates used are mostly in the as rolled condition. Experience has indicated that all stainless

steel studs used should be in the fully annealed condition to avoid brittle welds.

Plate thickness generally begins at $1/4$ in. There is no limitation on thickness of plate that may be welded by this method. Somewhat thinner stainless plate has been welded successfully. While some discoloration may occur while welding very thin stainless plate, welds are structurally sound.

Welding time varies primarily with the size of the plate.

Experience has shown that when welding studs up to $5/8$ in. diam with an 800 amp machine, it is advisable to limit the distance from the welder to 100 ft. This avoids variation in welds that may result from fluctuation in the electric current.

The earliest attempts at stud welding at Barry-Wehmiller Machinery Co. occurred nearly 5 years ago. Hand layouts were used but the results were somewhat short of the goals desired. Attempts to operate two 400 amp generators in tandem created problems that were not solved until an 800 amp unit was purchased. Considerable time was required to learn the desired welding time for all types of welds. Weld splash and unpredictable embrittlement continued to present problems until satisfactory techniques were worked out.

**ULTIMATE SHEAR STRENGTH
OF MILD STEEL STUDS**

Stud Diam., in.	Strength, lbs.	Stud Diam., in.	Strength, lbs.
$3/16$	1,525	$1/2$	10,800
$1/4$	2,700	$5/8$	16,400
$5/16$	4,220	$3/4$	24,300
$3/8$	6,070	$7/8$	33,000
$7/16$	8,280		

**TENSILE AND TORQUE STRENGTHS
OF MILD STEEL STUDS**

Stud Size	Yield Point		Stud Size	Yield Point	
	Ten- sion, lbs.	Torque, ft-lbs.		Ten- sion, lbs.	Torque, ft-lbs.
No. 8-32	800	25	$7/16$ -14	6,350	45
No. 10-24	1,000	35	$7/16$ -20	7,050	50
No. 10-32	1,200	40	$1/2$ -13	8,500	70
$1/4$ -20	1,900	95	$1/2$ -20	9,600	80
$1/4$ -28	2,150	100	$5/8$ -11	13,550	140
$5/16$ -18	3,100	195	$5/8$ -18	15,300	155
$5/8$ -24	3,450	215	$3/4$ -10	20,000	250
		(ft-lbs.)	$3/4$ -16	22,300	275
$3/8$ -16	4,600	25	$7/8$ -9	27,650	400
$3/8$ -24	5,200	30	$7/8$ -14	30,500	445



ROTARY filer table is an example of studwelding stainless. Plate used is 10 gage, $\frac{1}{8}$ in. thick. Tables may be 3, 4 or 5 ft diam.

One of the most significant early advances—the introduction of templates to simplify and speed up welding—is still used. Ordinary 16 gage hot rolled carbon steel is specified. Although jig drilling is not employed, accuracy of holes can be readily held to 0.002 in., —0 in. by buttoning on a milling machine.

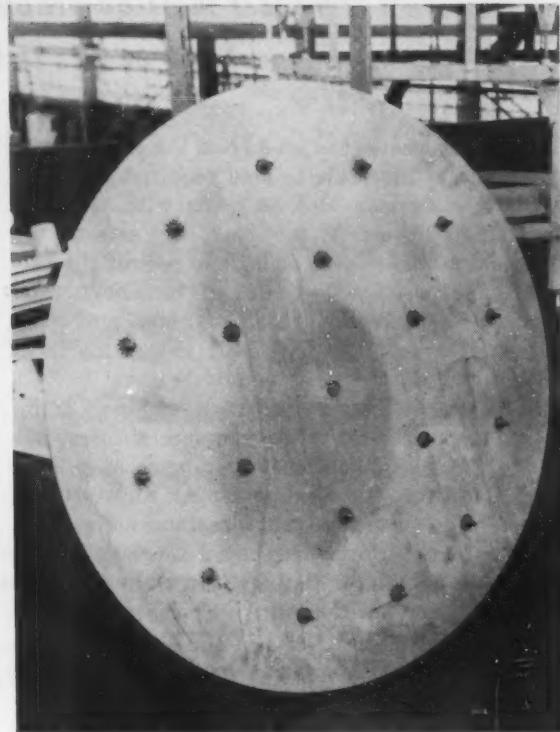
The usual practice is to use a hole 0.001 in. larger than the metal sleeve or bushing used as a guide for the center punch. The sleeve or bushing is 0.001 in. larger than the center punch. Carbon drill rod is used for the punch. The sleeve guide is generally standard commercial tubing.

Templates are used for bench work or they may be employed on fabricated tanks. The template covers as large a section as may be practical. Templates may be used for both flat and curved surfaces. For purposes of identification, all templates are painted a brilliant yellow.

It is also possible to use actual parts as templates. Where this is done, parts are carefully checked to make certain hole locations are within the limits established for templates.

Corrosion is major problem

Corrosion is often a serious problem in the type of equipment built by Barry-Wehmiller. To combat the corrosive effects of mild acids and alternately wet and dry surfaces as well as temperature effects, many tanks are galvanized inside by spraying with zinc. Where metal spraying is used, a special technique for stud welding has been developed. A flat bottomed drill is first used to break through the zinc coating. The



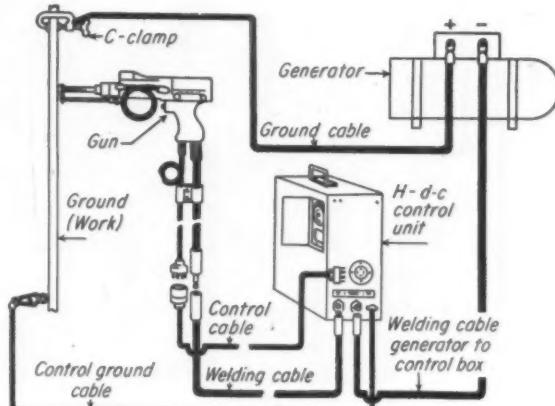
COMPLETED stud welding of rotary filer table. Accuracy of the stud position is held within 0.001 in. through use of accurate templates.

stud—usually stainless—is then welded in the usual manner, generally to a carbon steel plate.

Most of the stainless studs and plate specified are standard type 304 containing 18 pct Cr and 8 pct Ni. As mentioned earlier, fully annealed stainless studs are always specified.

The rotary filer table of the bottle cleaner unit shown here is an example of stud welding of stainless steel. These tables may be 3, 4 or 5 ft diam. Plate used for this application is 10 gage, approximately $\frac{1}{8}$ in. thick. Accuracy of the stud position is readily held within 0.001 in. through the use of templates that were designed especially for high accuracy.

For most applications templates are used and the stud location is center-punched in the plate.



COMPONENTS and circuits for stud welder.

"Physical tests on properly made stud welds showed that breakage invariably occurs in the threads rather than in the weld . . ."

The welder locates the stud from the centerpunch mark and is thus able to hold required accuracy.

Stud welds may also be made with the template in position. In this case, the hole in the template is made large enough to permit the ferrule to be positioned on the work. The ferrule then acts as a center control. Accuracy of position can be held just as closely using this technique as where the first method is used.

Stud location is regularly held within 1/32 in. Closer tolerances can be held in special cases.

For special applications, techniques have been worked out for stud welding copper, nickel alloys, brasses and bronzes and aluminum alloys although the need for these special alloys at Barry-Wehmiller is limited. Using hardened and ground bushings stud location can be held to 0.002 to 0.005 in.

Rejects run very low where proper techniques have previously been worked out. Visual examination of the fillet around the weld will usually disclose a faulty weld. Any variation in size or uniformity of the fillet invariably indicates a poor weld. In this case, the stud can be readily knocked

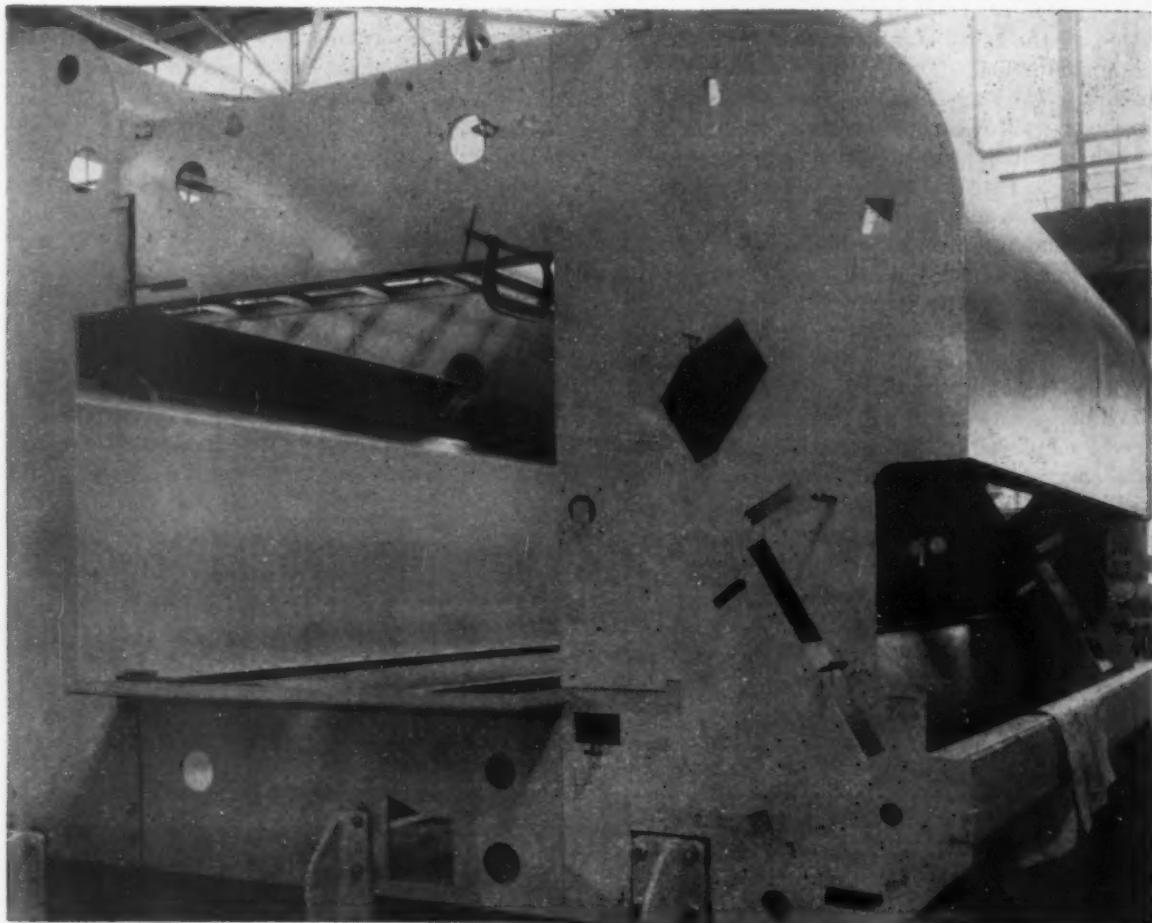
off with a hammer. After touching up with a grinding wheel, the weld location can be punch-marked and the welding operation repeated.

Physical tests on properly made stud welds show that breakage invariably occurs in the threads rather than in the weld.

Stud welding can reduce plate thickness and eliminate heavy bosses and flanges normally required for tap depth when securing cover plates and bearing caps.

All of the units built at the Barry-Wehmiller plant are assembled 100 pct. The units are then disassembled and shipped by sections throughout the United States as well as to foreign countries. The presence of residual stress in these units could create assembly problems in the field. Since no assembly difficulties have been reported, trapped stresses are believed to be unusually low.

During shipment, threaded studs are protected either by rubber tubing or the use of ordinary wood blocks. When these are used, nuts are screwed in position, assuring their availability for final assembly.



TEMPLATES are used for bench work or on fabricated tanks. Here they are used to position

studs for stud welding bottle cleaner unit. They can be employed on flat and curved surfaces.

How To Prevent Stress-Corrosion-Cracking in Aluminum Parts

By R. N. Hooker
Metallurgist

J. L. Waisman
Asst. Chief Metallurgist

Douglas Aircraft Co., Inc.
Santa Monica, Calif.

Part II

- ◆ Some aluminum alloys are subject to stress-corrosion-cracking . . . In parts or assemblies made from these alloys, control of the corrosion factor is especially important, particularly where stresses cannot be controlled or eliminated by other methods . . . Here are the results of tests used in evaluating coatings designed to prevent stress-corrosion-cracking.
- ◆ Two general types of coatings have been tested . . . One covers the metal completely to keep corrosives from contacting the base metal . . . The other, anodic to the base metal, prevents electrolytic action . . . Some combination coatings have proved especially effective.

◆ COATINGS DESIGNED to prevent stress-corrosion-cracking in aluminum alloys are being tested by Douglas Aircraft Co., Santa Monica, Calif. The coatings, often used where built-in stresses cannot be completely eliminated or controlled, permit improved control of the corrosion factor.

Coatings may protect in either of two ways. One type prevents direct contact between metal and atmospheric electrolyte. A second type acts anodically to prevent electrolytic corrosion. This type coating, anodic to the base metal, exerts its protection to adjacent unprotected areas.

Because of the difficulty of completely coating all surfaces, of maintaining complete continuity in service, and resisting moisture, effectiveness of coatings of the second type were tested. Such coatings would be superior in the face of local service penetrations and would permit safe exposure of the base metal in drilled holes, countersinks and spotfaces.

In the alternate-immersion test* used—an accelerated corrosion test—specimens were alter-

nately dipped for 10 minutes in a 3½ pct sodium chloride and tap water solution, at room temperature, then exposed to air above the tanks for 50 minutes. This test has been in use for a number of years by The Aluminum Co. of America.

Specimens used are shown in Fig. 1. Stresses were applied by tightening steel bolts attached in a diagonal fashion prior to testing. The bolt,

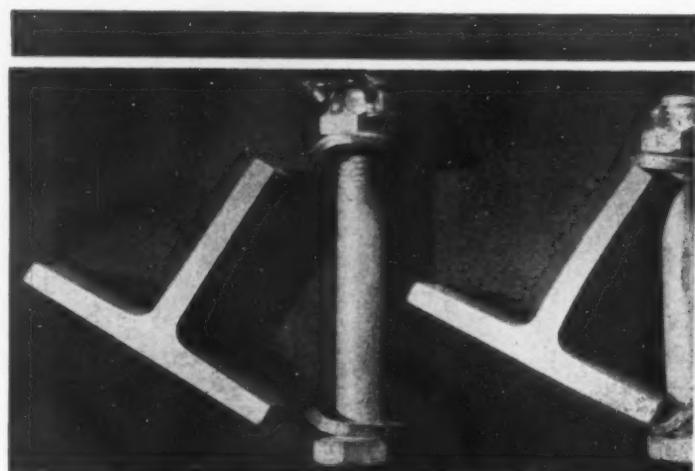


FIG. 1—Bolt, nut, and washers are used to stress test samples, shown here uncoated.

*See Part I, How To Prevent Stress Corrosion Cracking In Aluminum Parts, THE IRON AGE, Sept. 2, 1954.

Zinc sprayed specimens with organic coatings showed no failures in 45 weeks . . . Organic finishes delayed cracking . . .

nut, and washers were coated with mixed beeswax and rosin to avoid extraneous electrolytic effects. A stressed and masked sample is shown in Fig. 2. Stress distribution in each sample was evaluated by coating the surfaces with stress-coat, a brittle lacquer, and deflecting the sample by tightening the nut until a crack pattern appeared in the stress-coat.

Strain gages, having a $\frac{1}{8}$ in. gage length were applied to unstressed pieces at the critical locations determined by the stress-coat. Nuts were tightened, and micrometer measurements of the change in diagonal length were correlated with strain gage readings. Readings were plotted as in Fig. 3. All test specimens were prepared to the dimensions shown in Fig. 3.

Fig. 4 shows the results of tests on continuous coatings. Specimens of 75S-T6 and XA78S-T6 were stressed to the yield strength in the long transverse direction. Coatings tested included sprayed 72S aluminum alloy, sprayed zinc, thin zinc plate, and cronak treated specimens.

Cracking primarily intergranular

Control samples of XA78S-T6 cracked in 2 to 4 weeks, and the 75S-T6 samples in 8 to 10 weeks. Cracking was primarily intergranular.

Samples with sprayed coatings showed no failure after 33 weeks for both materials tested. The zinc electroplate plus cronak treatment did not prevent stress-corrosion-cracking in either of the materials. Plated XA78S-T6 specimens cracked in 6 to 7 weeks exposure. Two plated 75S-T6 specimens cracked after 19 and 31 weeks, but the third specimen was not cracked after 33 weeks exposure.

Based on these accelerated tests, where com-

plete coverage of the part is possible, either the zinc or aluminum spray will effectively prevent stress-corrosion-cracking. The thin (0.0005 in.) zinc plate cronak treatment delayed the start of cracking.

Tests were also made on XA78S-T6 samples to determine the effectiveness of thicker zinc electroplate and the effect of paint finishes applied over zinc electroplate and zinc spray. Test results are summarized in Fig. 5.

Thicker zinc plate helped

The thicker zinc plate increased the time to failure but did not prevent eventual cracking. The zinc plate remained in place after cracking was observed through the plating. A cronak treatment of the zinc plate produced no appreciable change in time to failure. When the plate was coated with zinc chromate primer, or with zinc chromate primer and white lacquer, no failures were observed after 45 weeks.

Zinc sprayed specimens with organic coatings showed no failures in 45 weeks. Organic finishes blistered during testing. Chromic acid anodizing delayed the start of cracking to about the same degree that a thin zinc plate and cronak treatment did in the series of tests described in Fig. 4.

These tests indicate that, complete coverage with a zinc spray, 72S aluminum spray, or a thick zinc electroplate with organic finish could delay stress - corrosion - cracking almost indefinitely.

To check effectiveness of anodic type coatings, specimens having exposed areas of base metal were subjected to alternate immersion tests. These had horizontal and vertical rectangular areas of various widths uncoated. Triplicate specimens of each type were tested. The test re-



FIG. 2—Jig is coated with beeswax and rosin mix to prevent extraneous electrolytic action.

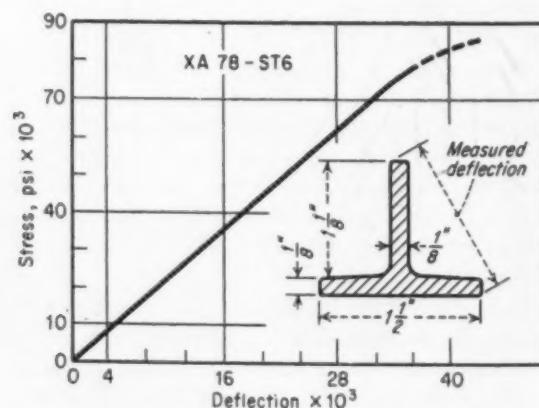
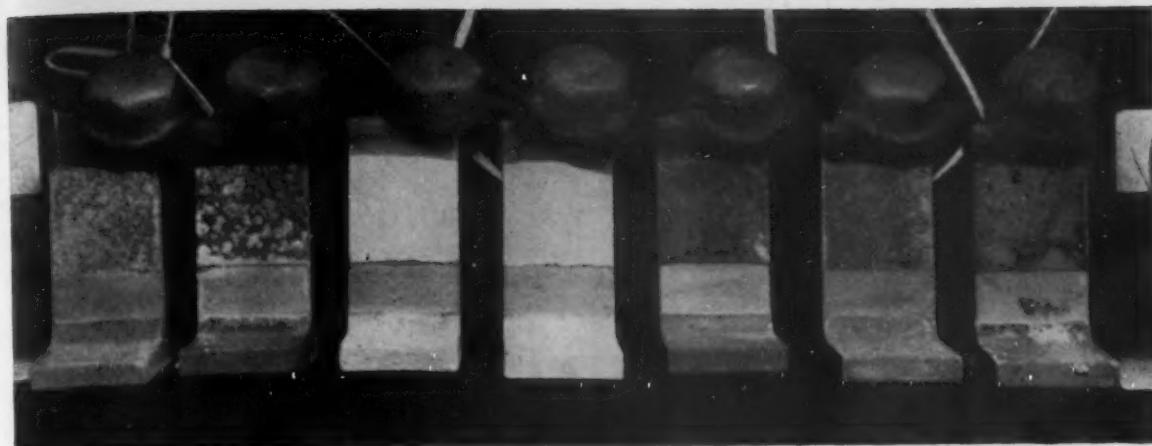


FIG. 3—Strain gage and micrometer were used to correlate stress vs. deflection in XA 78-ST6.



TYPICAL test specimens after 15 weeks exposure to the alternate immersion tests. Mag. IX

sults show very little difference in life between different shapes and sizes of uncoated areas. The 72S aluminum sprayed and the zinc sprayed samples tripled the life of both 75S-T6 and XA78S-T6. The thin zinc electroplate cronak treated coating approximately doubled the life.

The results of another series of tests on XA78S-T6 samples with $\frac{1}{4}$ in. wide uncoated areas are shown in Fig. 6. The thick zinc electroplate, the 72S aluminum spray and the zinc spray, each with the organic coating, increased the life of coated samples 20 to 30 times.

While these coatings offer promise for minimizing stress-corrosion-cracking, further evaluation based on cost, consistency, and effect on the mechanical properties is needed. Ability to sustain high bolt loads must be established. Any interference of these coatings with crack and defect inspection must be spotted.

The thick zinc electroplate is difficult to apply consistently to any but small simple shapes. The zinc coatings tend to relax under long sustained load and might drop the preload in bolts. Sprayed coatings "as applied" are too rough for an ex-

ternal finish. They are difficult to apply to close tolerance and sometimes spall when drilled or countersunk.

Sprayed coatings tend to "bridge" a fine base metal crack rendering it invisible. Penetrant crack-inspection techniques are not applicable to sprayed coatings since the porous sprayed metal traps the penetrant.

EDITOR'S NOTE: Part I of this article appeared in the Sept. 9 issue. It is based on a paper presented by the authors at the Western Regional Meeting of the National Association of Corrosion Engineers at Los Angeles.

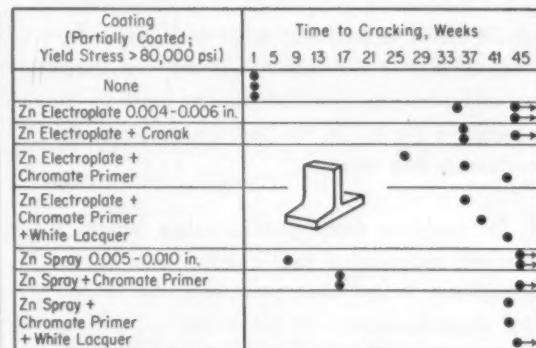


FIG. 6—Organic coatings and sprayed or plated zinc, or sprayed aluminum, gave good results.

Coating	Material	Stress (To Yield) psi	Time to Cracking, Weeks									
			1	5	9	13	17	21	25	29	33	
None	XA78S-T6	>80,000	●	●								
72SAI Sprayed 0.003 in.	XA78S-T6	>80,000										
Zn Sprayed 0.003 in.	XA78S-T6	>80,000										
Zn Electro Plate + Cronak 0.0005 in.	XA78S-T6	>80,000	●	●								
None	75S-T6	68,000		●	●							
72SAI Sprayed 0.003 in.	75S-T6	68,000										
Zn Sprayed 0.003 in.	75S-T6	68,000										
Zn Electro Plate + Cronak 0.0005 in.	75S-T6	68,000			●	●						

FIG. 4—Results of alternate-immersion tests on continuous coatings on 75S-T6 and XA78S-T6.

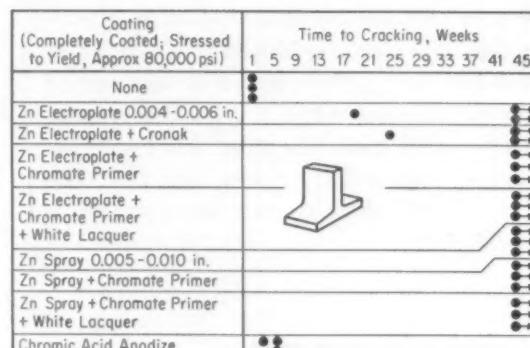


FIG. 5—Effectiveness of paint applied over sprayed and plated zinc on XA78S-T6 was tested on several highly stressed specimens.

CO₂ atmosphere—

How Melting Practice Affects Machinability of Malleable Iron

By E. A. Loria, Senior Engineer

Metallurgy Research & Development Dept., The Carborundum Co., Niagara Falls, N. Y.

- ◆ One of the characteristics of malleable iron is its excellent machinability . . . To assure good machining properties, it is desirable to avoid either a pearlitic edge or a deep ferritic edge . . . Pearlitic edges are prevented by chemical composition control and by an adequate period in the second stage of the malleable iron anneal.
- ◆ To avoid a deep ferritic edge which, if present, may cause tool buildup and harder machining, it has been past practice to control decarburization in the anneal . . . In recent tests, melting control is also found to be a factor . . . Two methods of melting were compared in this study.
- ◆ Both methods included melting in a small cupola then decarburizing in a 100-lb induction furnace . . . Decarburization was carried out by different methods . . . One was by diluting with steel, the other was by decarburizing with a CO₂ atmosphere . . . The CO₂ method showed much improvement in machinability.

◆ EXPERIMENTAL melting of white iron for malleabilizing has shown that the decarburizing can improve the machining ability of this material. Tests show that machining rates are better when the iron is decarburized by a CO₂ atmosphere instead of by diluting with steel.

About fifty pct of the malleable iron produced today is subjected to some machining operation. Experience has shown that a deep ferritic edge if present on a casting tends to clog the cutting tool by buildup on its edges causing the tool to burn and the metal to tear. A pearlitic edge if present is hard and tends to slow the machining rate.

Used constant-pressure lathe

Each of these conditions should be avoided to produce an iron of maximum quality. Upon malleabilizing, the unfavorable conditions appear as an uneven distribution of graphite particles from core to edge or as a segregation of residual pearlite in areas where the graphite nucleating tendency is low or where oxidation occurs.

The opinion has been that the hardness of malleable iron does not vary greatly and that any difference in machinability would follow carbon content more closely than any other factor. Having a ferritic matrix, malleable iron would be classified among the most readily machinable types of cast iron. Some studies have shown that a malleable iron consisting of ferrite and particle graphite has the same tool life characteristics as an annealed cast iron of free ferrite and flaky graphite.¹ Another study of

* Ed. Note—Work conducted by J. A. Sartell, L. F. Porter and P. C. Rosenthal, Dept. of Mining and Metallurgy, University of Wisconsin, as part of a more comprehensive study of malleable iron metallurgy sponsored by The Carborundum Co.

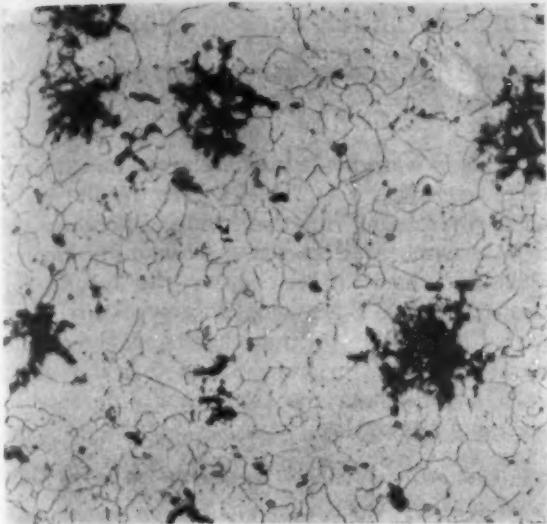
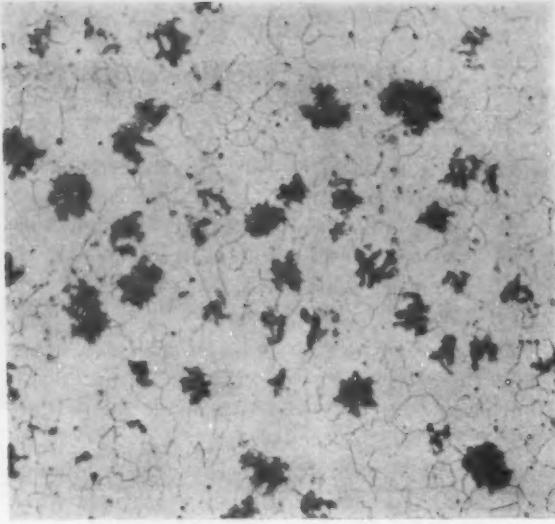


Fig. 1—Representative structures in areas where machining tests were made. Nital etch. X 100.



Left, iron 2A has a constant pressure lathe rating of 159 while right, iron 6B has 190 rating.

the relative machinability of malleable, nodular and gray irons, using the constant-pressure lathe as the measuring criterion, revealed that the malleable irons possessed the highest ratings for the three types of cast iron.²

Malleable iron rims are not always due to conditions of anneal; composition and melting practice are often responsible for certain types. Others have revealed the pronounced effects of melting furnace atmospheres on tensile properties and annealability.³ Other factors besides rim effects also contribute to different machinability ratings. Melting practice and nodule count are particularly important in the overall machinability of the metal. The effect of mold condition is another factor.

The present study was undertaken to show the effect of melting practice on the machinability of a series of malleable iron bars possessing the same chemistry and section diameter. Actually, the study concerns the machinability of the metal after all or a part of the rim had been removed when the bars were first turned down to eccentric rounds.

Adjust metal composition

Four heats were made using malleable scrap, steel and pig iron in a small cupola.* Subsequent adjustment of composition of the metal was by; (a) mixing it with an appropriate amount of steel in a 100 lb induction furnace, or (b) decarburizing it with a carbon dioxide atmosphere in the 100 lb induction furnace. After the iron had reached the desired carbon content for Class A malleable it was poured into various test bar molds.

The duplexing operation produced white irons of the chemical analyses given in Table I. Arbitration bars of $\frac{7}{8}$ in. diam x 15 in. long and cast three in mold were selected for machining tests. These were annealed in a laboratory electric

furnace at 1700°F for 60 hrs, cooled and held between 1340 and 1300°F for 48 hrs. Before testing the bars were turned to $\frac{3}{4}$ in. diam.

The Battelle constant-pressure lathe was used to obtain machinability ratings. Ratings are based on the assumption that an iron with superior machining characteristics cuts with a coarser feed than a poorer machining iron, when a constant-pressure is used to produce tool travel.

In the test, 2 in. turning cuts were taken with the same tool. Thrust pressure was applied by a weight and pulley system and a cam-operated counter recorded spindle revolutions. These readings were used to calculate feeds or machinability ratings which were based on cold-drawn B 1112 steel as having a rating of 100.

Tests were made on the standard bar at the beginning and end of cuts on a group of test

TABLE I
COMPOSITION AND GRAPHITE NODULE COUNT

Heat No.*	Pet.					Nodules**
	C	Si	Mn	P	S	
2A	2.22	1.01	0.41	0.071	0.140	11
2B	2.25	1.01	0.43	0.093	0.140	35
3A	2.28	1.02	0.40	0.070	0.135	28
3B	2.24	1.04	0.41	0.080	0.135	26
5A	2.29	1.09	0.43	0.075	0.135	22
5B	2.28	1.07	0.41	0.080	0.135	28
6A	2.20	1.00	0.37	0.079	0.150	8
6B	2.20	1.06	0.38	0.089	0.150	90

* Suffix A: White iron mixed with steel.

** Ave. nodules per sq mm at 100.

"Irons held in an induction furnace under carbon dioxide have higher nodule counts than irons melted under air or nitrogen . . ."

bars. Five tools were used in order to compensate for unintentional variations in tool conditions. Tests were standardized at 32 fpm (140 rpm) with a tool thrust of 81 lb for a $\frac{1}{8}$ in. deep turning cut. High speed tools with 12° side relief and side rake angles were used.

The data for the four pairs of malleable irons of like chemistry are given in Table II. Significant differences occur between bars made by the two types of melting procedures.

The irons decarburized with carbon dioxide have much higher machinability ratings than those diluted with steel. A statistical study of the individual constant-pressure ratings revealed that the probability of a difference in rating being produced by the difference in melting practice was highly significant. The difference between average values was 21.7 while the least significant difference at the 1 pct level was only 6.8. The difference in ratings for the two practices is significant far beyond the 1 pct level where the odds are 1 in 100 that the difference would be this large by chance alone.

Nodule number affects machinability

This same statistical study showed that there were very significant differences in machinability at different locations along the length of each test bar.

To explain the different ratings, nodule counts were made on the test bars. In all cases, mea-

surements were made on four areas and the results averaged, see Table I. The results show some correlation in that wide differences in nodule number affect the machinability rating. This is evident in comparing the results for irons 2 and 6. Such wide differences are illustrated in Fig. 1. On the other hand, the nodule count difference in irons 3 and 5 is not great enough to explain the significant difference in machinability rating.

Decarburize with CO₂

Apparently, the beneficial effect on machinability brought about by decarburizing the irons with carbon dioxide is only partially explained by an increased nodule count. It has been shown that furnace gases have a marked effect on the number of graphite particles present in the annealed iron and that irons held in an induction furnace under carbon dioxide have substantially higher nodule counts than irons melted under air or nitrogen.

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2. "How Machinable Are the Cast Irons?", E. A. Loria, The Iron Age, Vol. 168, Nov. 1953, p. 158.
3. "Effects of Melting Furnace Atmosphere on Casting Properties and Annealability of Malleable Iron," E. A. Lange and R. W. Heine, Transactions, AFS, Vol. 61, 1953, p. 107.

TABLE II

CONSTANT-PRESSURE MACHINABILITY DATA FOR MALLEABLE IRON

Heat No.*	"R" Values for Individual Tests					Individual Machinability Ratings					Ave. Rating	Coefficient of Variation	
	1	2	3	4	5	1	2	3	4	5		Units	Pct
2A.....	17.2	18.2	18.0	17.6	18.9	140	157	179	167	151	159	13.4	8.4
2B.....	14.3	15.8	16.2	14.8	17.2	169	181	199	199	166	183	14.2	7.7
3A.....	15.6	17.2	18.1	16.6	17.1	155	166	178	178	167	169	8.8	5.1
3B.....	14.7	15.4	15.6	13.5	17.2	164	186	207	219	166	188	21.8	11.6
5A.....	17.0	17.4	16.9	17.3	18.1	141	164	191	170	157	169	17.0	10.0
5B.....	15.5	16.2	15.9	14.8	17.5	156	177	202	199	163	179	18.6	10.4
6A.....	15.9	19.1	18.4	16.5	18.5	151	149	175	179	154	162	12.7	7.9
6B.....	14.2	14.6	15.2	14.8	16.4	170	196	212	199	174	190	15.8	8.3
"Y" Standard First.....	31.4	33.0	37.0	34.2	34.8	.....	.....	.....	.....	.....	.....	.....	.....
Last.....	24.7	33.6	37.9	34.4	31.5	.....	.....	.....	.....	.....	.....	.....	.....
Corresponding Value for Steel "R".....	24.1	28.6	32.2	29.5	28.5	.....	.....	.....	.....	.....	.....	.....	.....

* Suffix A: White iron mixed with an appropriate amount of steel.

Suffix B: White iron decarburized with carbon dioxide atmosphere.

For close tolerance—

High Temperature Alloy Fastenings Require Careful Fabricating, Precision Heat Treating

By T. W. Harker Metallurgist, Aero Div., H. M. Harper Co., Morton Grove, Ill.

Alloy fastenings for elevated temperature service must meet rigid specifications for size, finish and mechanical properties . . . Alloys are usually the austenitic type, either hardenable or non-hardenable . . . They require careful fabricating, special heat treatments and quality control checks at each processing stage. Fastenings at this plant are heat treated in gas fired radiant tube, controlled atmosphere furnaces . . . Heating, cooling, quenching and atmosphere generating facilities are integrated in compact, high production units . . . Furnace design promotes minimum cycle time with maximum simultaneous use of heating, cooling and quenching areas.

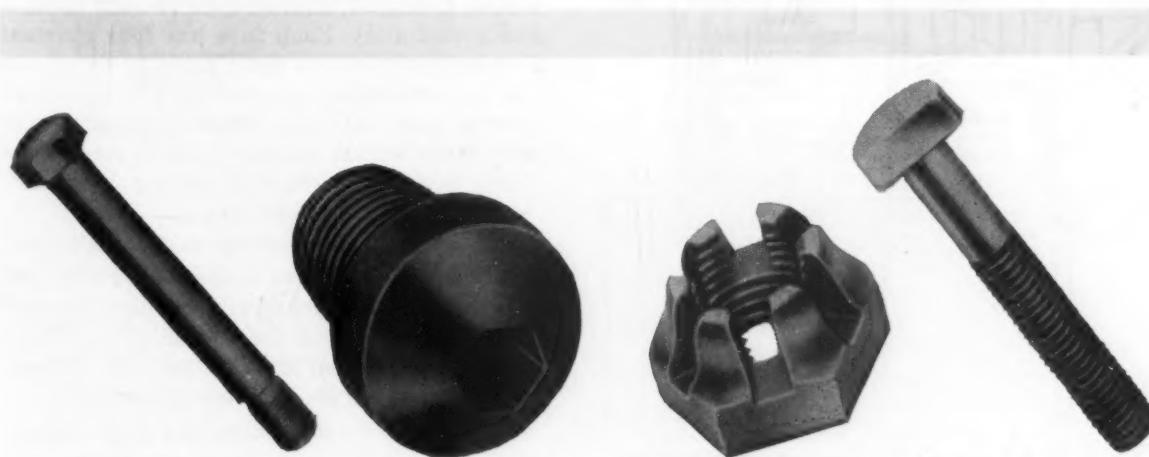
♦ FASTENINGS AND BOLTS for elevated temperature use in gas and steam turbines, turbojet aircraft power plants and atomic power applications are highly specialized engineering and metallurgical achievements. Designs are not standardized. Tolerances are necessarily extremely close and mechanical properties are near the limits of forging and machine fabrication ability.

These special purpose bolts are produced at the H. M. Harper Co., Morton Grove, Ill., by machining a bar the same size as the head or by upsetting the head from bar stock about equal to shank diameter. Threads are either cut or rolled. Most high temperature bolting specifica-

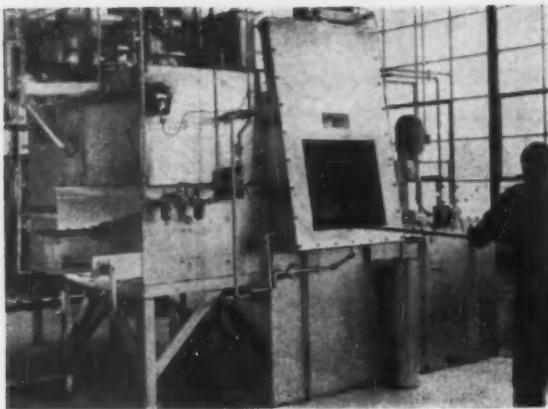
tions require rolled threads, since the notch effect is reduced where material is not removed but merely displaced.

Resistance to corrosion and oxidation are essential in high temperature applications. Fortunately, the combination of the alloying elements (tungsten, molybdenum, cobalt and chromium) which increase the strength at elevated temperature, also increase resistance to oxidation and corrosion.

Most high temperature bolting alloys have an austenitic microstructure. Some are capable of precipitation or age hardening. They are used for high temperature applications because the crystalline structure is inherently stable, which



FASTENINGS for high temperature use need close control of size, finish, grain, strength, etc.



ELEVATOR and transfer device shift work from heating unit to cooling area or quench tank.

results in retention of unusual strength and hardness at all temperatures.

Proper heat treatment is extremely important for both the age-hardening and non age-hardening austenitic type alloys used in high temperature bolts and fastenings. Close control of these processes is a highly critical operation requiring precision equipment. In many cases heat treating cycles last up to 45 hours.

With age-hardenable austenitic alloys, two heat treatments are needed to obtain required properties. One is a solution treatment to recrystallize and refine grain structure and to put the precipitant in solution. It also softens metal for ease of subsequent machining and forming. The other requires age-hardening after machining at a temperature or combination of temperatures from 1200° to 1600°F. This type of hardness is retained at service temperatures below the minimum aging temperature.

It is customary to roll threads when the metal

is in the solution heat treated condition because this increases the number of slip planes. Aging or precipitation hardening takes place along these planes of crystal movement.

The nonhardenable austenitic alloys are either stress relieved or annealed after cold working to return the metal to a stable condition. This reduces internal or residual stresses without an appreciable decrease in hardness. At the same time, it increases the room temperature yield strength of the metal.

To perform these heat treatments with precise control of temperature and material surface condition, the firm uses two Allcase, radiant tube equipped, controlled atmosphere furnaces. Practically all production annealing, aging and solution heat treating at the Harper Co. plant is done in these furnaces.

Furnace features elevator

The furnaces, designed and built by Surface Combustion Corp., Toledo, are gas-fired radiant tube-heated units with a recirculating fan in the heating chamber. They also feature a hooded quench vestibule which contains a 900-gal oil quench tank and an air cylinder-operated elevator. A propeller-type agitator in the quench tank rapidly circulates large quantities of oil through a baffle arrangement, resulting in a downward flow of oil through the work. This flow direction is ideal for small parts treated in basket loads.

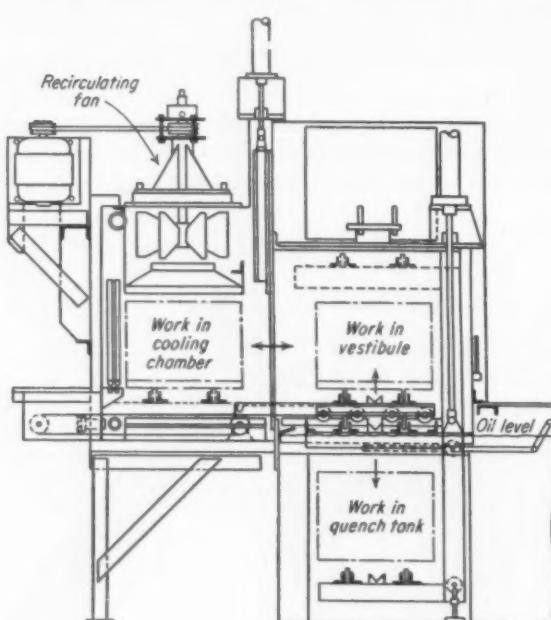
A charge consists of two trays, with loaded baskets, coupled together as a single unit. The heating chamber, with effective area of 24 x 36 in., accommodates both trays at one time. Entire charge is also quenched at one time on the bottom level of the double-tier quench elevator, permitting a new load to be charged while the first is cooling in the quench tank. The result is the shortest possible cycle and maximum "on the line" productive furnace time. Loads vary from 100 to 500 lb per charge depending on process and type and size of parts treated.

Prevents gas contamination

The heating equipment consists of four horizontal, U-shaped, suction-type radiant tubes of heavy cast alloy. Each tube has four constant-burning pilots and is manifolded to an exhaust fan for combustion gas removal. Since the tubes operate under a slight negative pressure, furnace gases cannot become contaminated in case a leak develops in the tube casting. Heat input is up to 600,000 Btu per hour.

A cast alloy propeller-type fan in the furnace arch, rapidly circulates atmosphere gases down over the radiant tubes on either side of the work load, and up through the bottom of the charge baskets. This action provides uniform exposure of the fastenings even in very dense loads.

The prepared atmosphere is a high-nitrogen type and is used for all processing in the heating and cooling chambers as well as in the



NEW LOAD goes in for heating while another is being quenched and a third charge is cooling.

quench vestibule. It is produced in a fully automatic ammonia-air reactor and is practically pure nitrogen with a controllable hydrogen content. The atmosphere is thoroughly dried-out in a chemical drier before introduction to the furnaces. Dewpoint is maintained at — 50°F.

The atmosphere generator is located to the rear and manifolded to both furnaces. A self-contained Bell & Gossett oil cooling unit is also located behind the furnaces. This compact, continuous type unit contains pumps, strainers and motor starters, and an oil cooler mounted horizontally.

For all work which must be cooled in a protective atmosphere, each furnace is also equipped with a forced circulation cooling chamber. This chamber is to the left of the quench vestibule and contains a recirculating fan and water cooled heat exchanger elements. These elements surround the work load on three sides and remove heat from the work at a controlled rate while the high-nitrogen atmosphere is rapidly circulated through the load.

Uses transfer table

To transfer a heated charge into this cooling chamber, the operator brings the loaded trays onto a transfer table that operates on the quench elevator. After moving the loaded trays into the purged cooling chamber the operator closes the door and starts the recirculating fan. The charge can remain in this chamber as long as required, and a new load can be immediately pushed into the heating chamber.

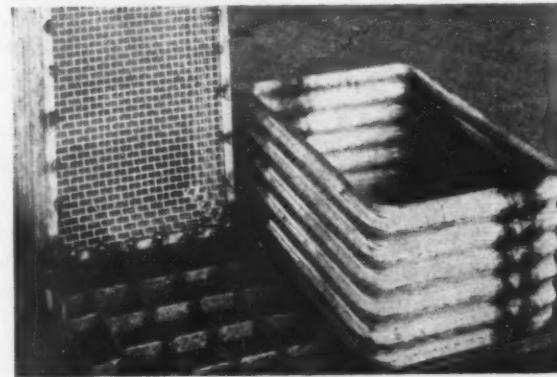
The aircraft frame and engine manufacturers who buy most of these fasteners, demand rigid quality control of size, finish and mechanical

properties. Weight of each piece has to be exact. Quality control becomes progressively more critical at every stage from raw material through packaging. Some parts are even individually wrapped.

Each lot of raw material is tested for tensile strength, hardness, dimensions, grain size, hardenability and surface condition. Chemical analysis checks the amount of each alloying element.

In cold heading, samples of parts from each machine setup are sectioned for grain flow determination. Rolled threads are checked for folds and laps by microscopic examination. Thread dimensions are optically checked and surface finish is examined by a profilometer.

Samples from heat treated lots undergo a microscopic examination for grain size, carbides in solution, etc. Hardness and tensile tests check other sample pieces from each furnace charge. Finally, finished products are spot checked again for chemical and mechanical properties.



BASKETS and coupled trays carry fastenings.

BASIC PROCESS CYCLES

Austenitic Alloys — Nonhardenable

Raw material—cold drawn wire or rod

1. Cold head.
2. Anneal at 1825 to 1900°F from 10 min. to 1 hr.
3. Oil quench.
4. Check hardness and microstructures.
5. Clean and rinse.
6. Dry in hot air.
7. Check size.
8. Finish machine.
9. Stress relieve 1 to 4 hr in atmosphere at 700°F.
10. Cool in atmosphere cooling chamber.
11. Microstructure, hardness and tensile tests.
12. Ready to ship.

MARTENSITIC ALLOYS

Raw material—cold drawn wire or rod

1. Cold head.
2. Finish machine.
3. Heat at 1800°F for 1/2 hr.
4. Oil quench.
5. Check for 40 RC minimum hardness.

Austenitic Alloys — Hardenable

Raw material—cold drawn wire or rod

1. Cold head.
2. Solution heat treat at 1800°F for 1 hr.
3. Oil quench.
4. Check hardness and microstructure.
5. Clean and rinse.
6. Check size.
7. Finish forming or machining.
8. Age harden at 1200° to 1600°F from 16 to 45 hr.
9. Cool in atmosphere cooling chamber.
10. Check for hardness of 23 to 33 RC.
11. Check for minimum 130,000 psi tensile strength.
12. Ready to ship.

6. Clean and rinse.
7. Check part size.
8. Draw at 700° to 1400°F from 1 to 4 hr.
9. Cool in atmosphere cooling chamber.
10. Check hardness and tensile strength.
11. Roll thread if required.
12. Ready to ship.

Better Permanent Mold Techniques Improve Casting Quality

By H. E. Zahn, Director of Research, Gould-National Batteries, Inc., Depew, N. Y.

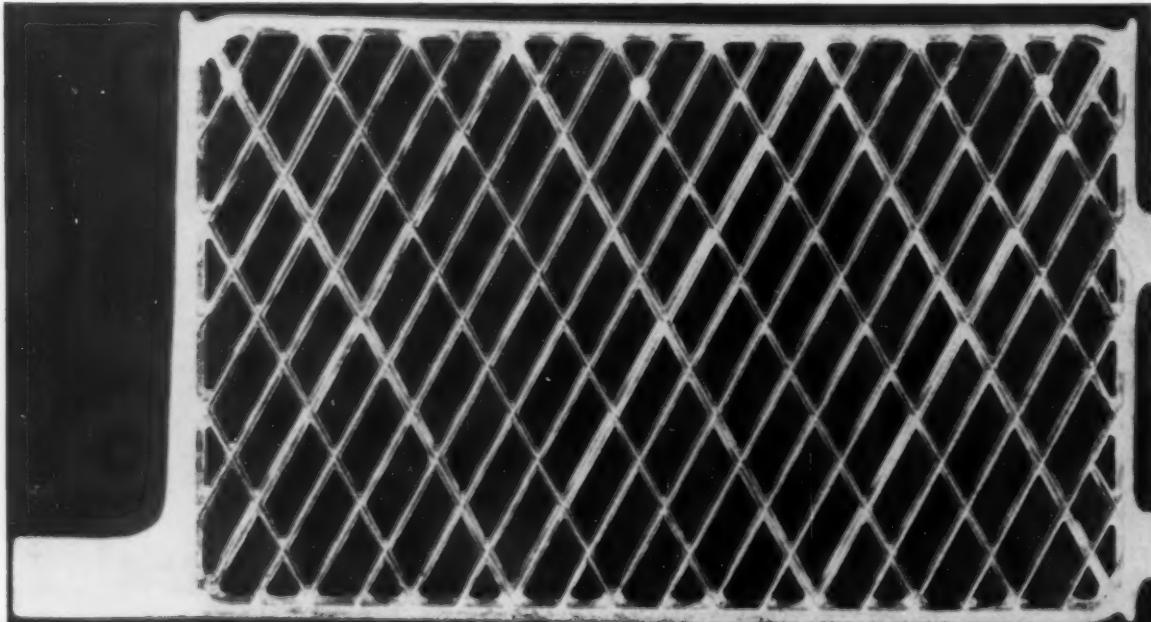
- ◆ Practically flawless storage battery plates are produced by improved permanent mold casting techniques . . . Metal and mold temperatures are automatically controlled . . . Metal is withdrawn from below melt surface, fed to the mold through a closed tube to minimize drossing.
- ◆ Solidification stresses, dross inclusions, gas cavities, other tiny flaws in old-style battery grids meant rapid deterioration in service . . . New grid design, plus better casting control eliminates most of these defects, means longer life for lead-acid batteries.

◆ NEW AND CAREFULLY controlled permanent mold casting techniques and a modified grid design have substantially improved the quality and service life of lead alloy storage battery plates made by Gould-National Batteries, Inc., Depew, N. Y.

Several years ago the company started exten-

sive research on permanent mold casting to determine what factors caused casting defects and how these could be controlled. It had already been established that battery plate deterioration and short battery life were traceable to original microscopic casting flaws.

In battery service, these tiny flaws and cavi-



NEW Diamond Z design is stronger, free from microscopic flaws due to new casting methods.

ties eventually filled up with corrosion products. This material wedged the metal apart, causing grid fractures. Such breaks in the structure reduced electrical continuity and weakened the plates.

The lead base casting alloy was not at fault. Character and influence of the flaws was such that alloy modification would not eliminate them or reduce their effect on battery performance.

Investigation did show that some of the tiny defects were caused by solidification stresses, segregation effects, and impacting of hot metal by mechanical mold ejectors. Others were due to micro porosity, subsurface gas cavities and shrinks.

Change grid design

Elimination and control of these defects was established by first studying their causes and then modifying the casting equipment and techniques as well as the battery plate design.

Result has been the introduction within the past year of a new grid design known as the Diamond Z. Comparing the accompanying photographs shows that distribution and relationship of the Diamond Z members provides an improved grid structure. Compared to earlier designs, the increase in the number of grid members was accomplished without a proportionate increase in weight.

The Diamond Z grid is produced on automatic casting equipment shown in an accompanying photograph. Mold and metal temperatures are automatically controlled during the repetitive casting cycle.

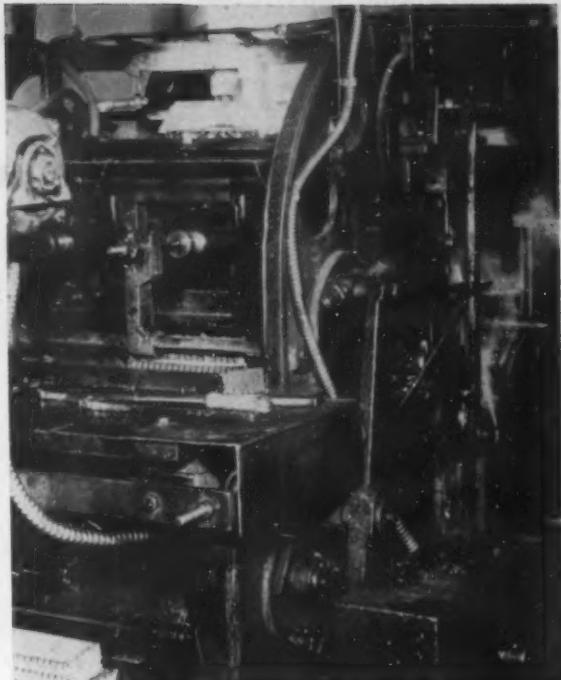
The diagonal grid design is structurally strong, having some variation in the cross-sectional area of its diagonal members. Controlling the amount of this variation where thick and thin diagonals meet prevents micro-porosity and solidification cracking at these junctions.

Control dross formation

Dross effects are minimized by withdrawing metal below the melt surface and conducting it to the mold through a closed pipe. Dross formation as the metal falls into the mold is controlled by partial gas atmosphere. Any dross formed as metal passes through the mold is filtered out by a novel gate design. By taking advantage of density differences, the low density dross is forced to float up into a scrap portion of the cast.

Casting cracks due to mechanical ejection are eliminated by having one set of knock-out pins operate on a scrap portion of the cast and a second set which operates on a chill cast section.

The Diamond Z grid is gated along one side of longest dimension. By controlling the cavity change rate in the mold and by feeding the diagonal members simultaneously, the metal advances uniformly and without turbulence to prevent gas entrapment.

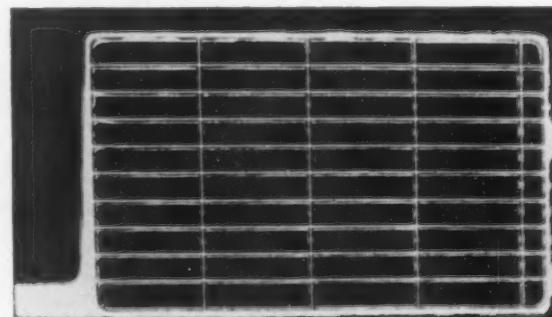


PERMANENT mold casting setup features automatic temperature controls, less drossing.

The research program has produced many benefits. Design engineers have been able to incorporate new mechanical and electrical advantages in the battery plates; more efficient metallurgical control of the casting process produces better, longer-lived grids; and the production department can maintain the new quality standards more easily than before. Last, but far from least, the end battery product is definitely more satisfactory to the ultimate user.



TINY casting flaws in original plate design led to rapid corrosion, eventual plate failure.



THIS grid design superseded the original plate, was itself replaced by new Diamond Z type.

For machining plastics—

Special Fixtures Combine Three Setups

◆ PLASTIC moldings with metal inserts are some of the difficult components machined rapidly in the Endicott, N. Y., plant of International Business Machines Corp. These moldings have a central hole whose bore must be held within much closer dimensions than are held in molding around a core pin, hence the hole must be machined. Cuts are light, but the plastic is not classed as easy to machine.

Until recently, this job was done on three machines each requiring a separate operator.

On the first, only the central hole was reamed in each piece, at the rate of 5000 in 8 hours. Then, each hole was bored and finally it was ground. In each of these operations, only 600 pieces were completed per 8-hour shift. Furthermore, since each operation produced a fine dust that was irritating if inhaled and also made the machines dirty, a new setup in a Le Blond boring machine was substituted.

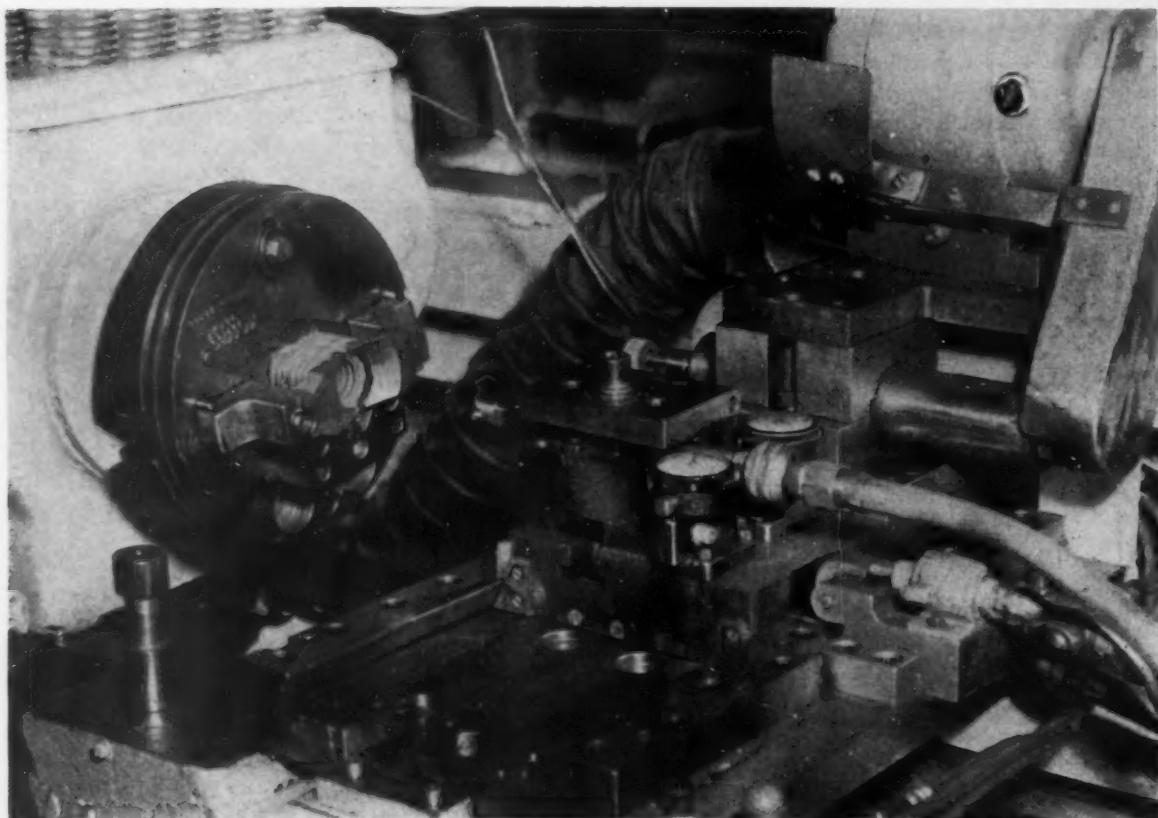
This machine is equipped with a chuck having special jaws that hold seven work pieces in correct alignment at a time. The pieces are

located over a pin which retracts before the cuts are made. When the pieces are loaded and clamped, an initial cut is made by a carbide boring tool in a holder on the cross slide. This tool brings the hole within 0.008 to 0.009 in. of finished size.

After the tool is withdrawn, the carriage is automatically traversed forward to bring a small wheel on a high speed, belt-driven spindle, mounted on the carriage, into position for making its cut. The carriage is then fed forward and the wheel grinds the hole in all seven pieces.

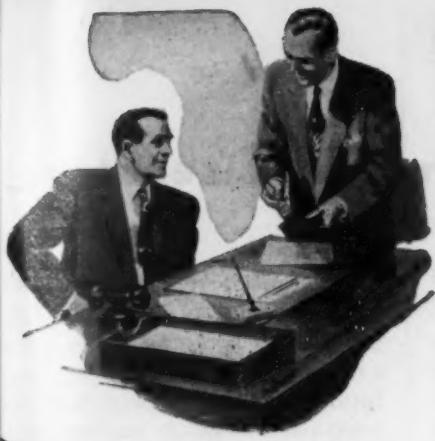
After grinding the wheel retracts and is moved to the initial position to complete the cycle, except unloading the chuck. Thus, three operations in 1500 pieces per 8-hour shift are completed. Tool motions are effected by air plungers.

To dispose of the chips, a suction line is attached at a gland at the inner end of the hollow spindle. Suction is sufficient to draw all chips and dust through the spindle and deposit them in a box. The machine therefore is kept clean and no dust is discharged into the room.



SETUP on a Le Blond machine which bores and grinds the central hole in seven plastic moldings

at rate of 1500 pieces in 8 hours. All chips and dust are sucked off through the hollow spindle.



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See Rust-Oleum 769 Damp-Proof Red Primer actually applied over a badly rusted surface after simple scraping and wire-brushing to remove rust scale and loose rust in the Rust-Oleum "rusted panel demonstration." Rust-Oleum's specially-processed fish oil vehicle penetrates rust to bare metal usually eliminating sandblasting and other costly surface preparations.

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New Technical Literature:

Heat treating pots

Bulletin describes and gives specifications for heat and corrosion resisting alloy-cast heat-treating pots, tubs, and carburizing boxes. Specification tables cover round pots, rectangular tubs, rectangular carburizing boxes, and round carburizing boxes. *Standard Alloy Company, Inc.*

For free copy circle No. 1 on postcard, p. 183.

Surface finishes

Illustrated technical bulletin tells how flange surface finishes affect gasket sealability and joint performance. It provides a basis for selecting the flange surface finish most suitable for a given gasket, and explains why the right finish makes it easy to achieve an initial seal and obtain the best joint performance. *Johns-Manville*.

For free copy circle No. 5 on postcard, p. 183.

Mechanical finishing

Outlined in a new bulletin are products and equipment used for mechanical metal finishing. Listed is H-VW-M's line of standard buffs, compositions, sisal buffs, brushes, polishing wheels, polishing and buffing lathes, and other equipment and accessories. *Hanson-Van Winkle-Munning Co.*

For free copy circle No. 2 on postcard, p. 183.

Welcome booklet

New booklet is available designed to be used as a pocket secretary in addition to furnishing information about Denison's plant and offices. Background of the company is discussed and illustrated. Included are a list of company officers, a map, and hotel, restaurant and travel information. *Denison Engineering Co.*

For free copy circle No. 6 on postcard, p. 183.

Prab catalog

Illustrated catalog describes products and conveyor equipment. Featured are three new products: the Magnavator, the Tube-veyor, and the Chip-a-way. More information is given by supplementary diagrams. *Prab Conveyors, Inc.*

For free copy circle No. 3 on postcard, p. 183.

Shaft couplings

New catalog-specification bulletin illustrates and describes shaft couplings rated from $\frac{3}{4}$ to 1500 hp. Data include list of available sizes with dimensions, weights, and safety factors for use with various types of equipment. Complete specifications for Protecto-Pin couplings are included. *Brown Engineering Co.*

For free copy circle No. 7 on postcard, p. 183.

Vibration meter

Folder illustrates and discusses vibration meters and associated equipment. A table of specifications is included. Input and output equipment and accessories are described. *Consolidated Engineering Corp.*

For free copy circle No. 8 on postcard, p. 183.

FOR YOUR COPY

Money-saving products and services are described in the literature briefed here.

For your copy just circle the number on the free postcard, page 183.

Catalogs and Bulletins

General products

Catalog describes and illustrates all Aireo products regularly used by job shops, maintenance departments, and other users of light welding and cutting equipment. Catalog covers gases, welding and cutting equipment and accessories—torches, tips, regulators, electrodes, etc. Complete specifications and stock number information is supplied. *Air Reduction Sales Co.*

For free copy circle No. 9 on postcard, p. 183.

Valve controls

The Limi-Torque valve operators are described fully in this catalog. Among items discussed is a valve control for large or small valves. This control limits the amount of torque applied to valve operating parts. Stressed are its simplicity, economy, and dependability when fully automatic operation is desired. Operational details and illustrations are shown. *Philadelphia Gear Works.*

For free copy circle No. 10 on postcard, p. 183.

Hoists, cranes

Included in the latest issue of the Crosby Clipper are numerous stories about construction jobs in which American Hoist & Derrick Co. equipment has been used. The publication is well illustrated with on-the-spot photographs showing the company's equipment in action. *American Hoist & Derrick Co.*

For free copy circle No. 11 on postcard, p. 183.

Power spray washers

Bulletin illustrates and discusses in a clear and comprehensive manner all types of power spray washers and their layouts and applications. Engineering drawings, incorporating only the essential features of a number of most commonly used types of washers, are included. The specifications of each model pictured are given. *Peters-Dalton, Inc.*

For free copy circle No. 12 on postcard, p. 183.

SHENANGO Centrifugal
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Centrifugally cast Meehanite Metal printing press rolls with circumferential and longitudinal scoring. Because these close grain Shenango castings are better able to resist distortion and deflection, they are ideal for continued, trouble-free service where conditions are rugged.

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FREE TECHNICAL LITERATURE

Re-equipment planning

Brochure put out by Cincinnati Milling Machine Co. provides information on the advantages of a good equipment policy. Stressed is the importance of a dynamic equipment policy, and the lengthy and intensive study required. Also included is a listing of the company's various types of machine tools. *Cincinnati Milling Machine Co.*

For free copy circle No. 13 on postcard, p. 10.

Shapers

The Michigan Tool Shear-Speed shaper line is summarized in this booklet. Outlined is the process for cutting gears, splines, cams, sprockets, and miscellaneous external shapes. Tooling, accessories, machine operation, controls, feeds, and applications are discussed. Illustrations and tables of specifications provide further information. *Denham & Co.*

For free copy circle No. 14 on postcard, p. 10.

Melting furnaces

Single burner stationary crucible furnaces for brass, bronze, and aluminum are discussed and illustrated in this bulletin. Emphasized are the furnaces' efficiency, durability, and flexibility. Oil and gas fuel units are described and fuel consumption is discussed. A table giving additional information is included. *Campbell-Hausfeld Co.*

For free copy circle No. 15 on postcard, p. 10.

Electrical equipment

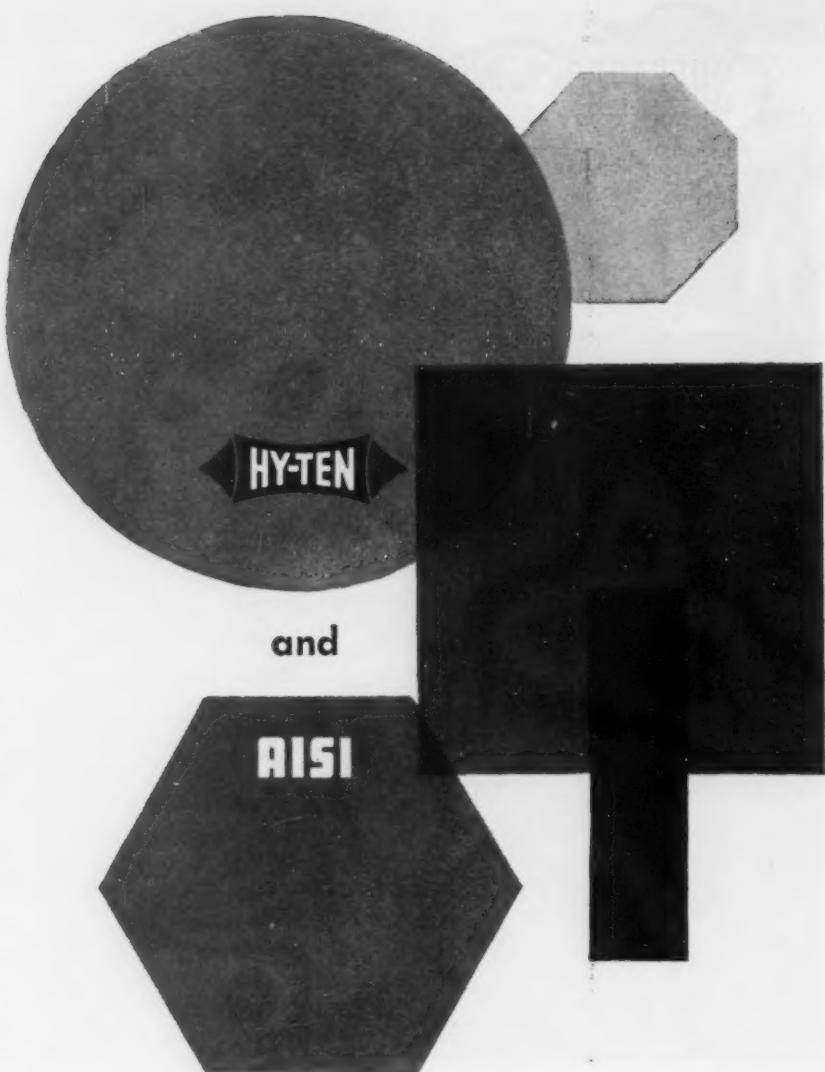
Leaflet features three newly designed rectifiers and new voltage regulators for the metal finishing industry. Each cabinet size, current, and voltage output is listed in charts included in supplement. Featured equipment is illustrated along with a description. *Frederic B. Stevens, Inc.*

For free copy circle No. 16 on postcard, p. 10.

Engineering handbook

The "600" series bearing alloys, a group of light-weight, high-strength, copper-zinc base alloys are described in a new catalog. Illustrations, diagrams, and tables give supplementary information. *Muelier Brass Co.*

For free copy circle No. 17 on postcard, p. 10.



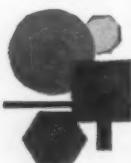
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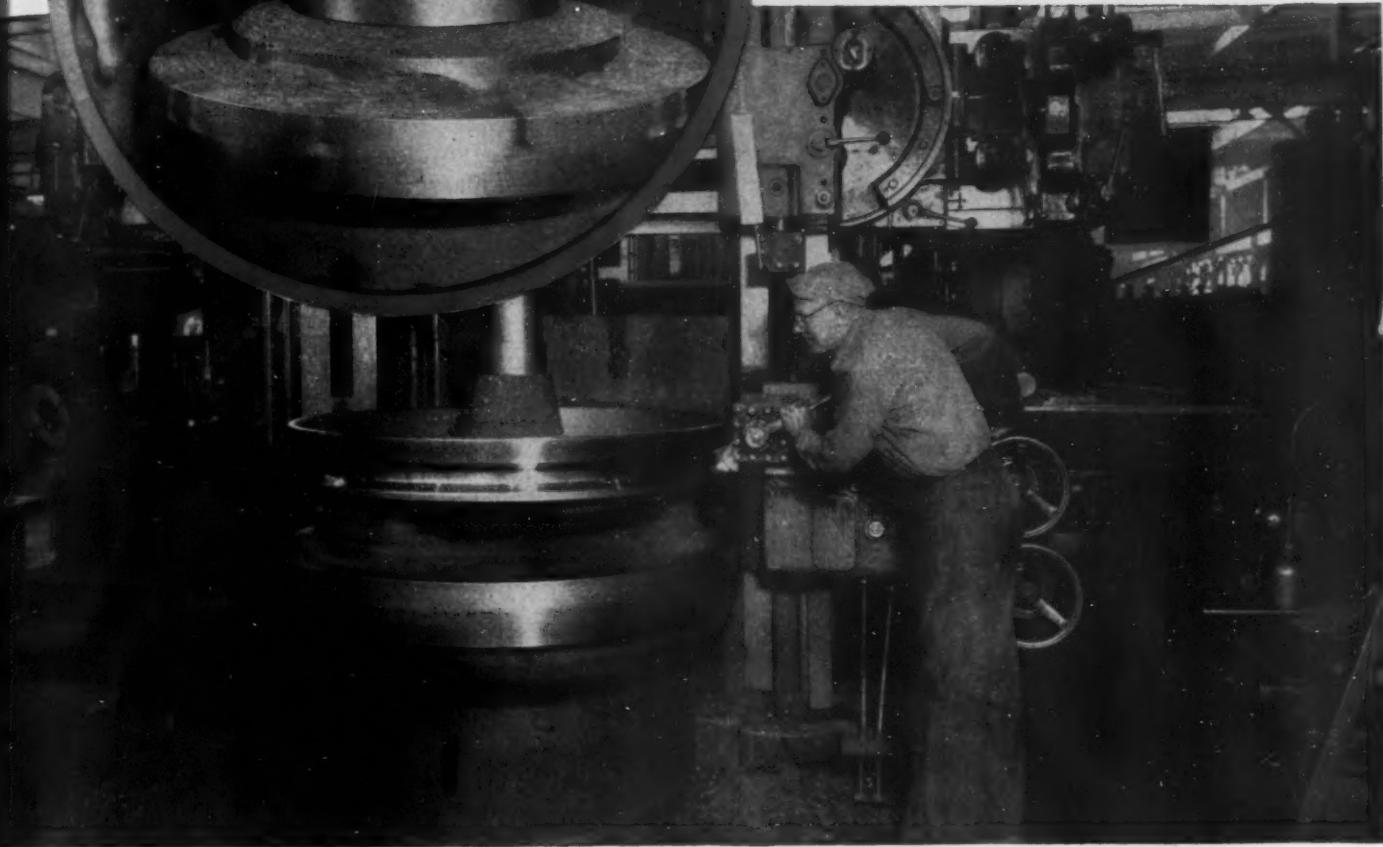
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Lincoln powdered iron electrodes introduce new savings in arc welding

THROUGH the use of powdered iron in the electrode coating, Lincoln "Jetweld" utilizes the heat of the arc more efficiently than conventional electrodes. The iron powder is deposited in the weld, permitting higher welding speeds . . . 35% and more, without sacrifice in strength or quality.

"Jetweld" electrodes have smooth, automatic-like appearance. They are self-cleaning to simplify fabrication and cut costly man-hours.

A drag-type electrode, "Jetweld" provides easy operation in flat and near flat position work. "Jetweld 1" (E-6012) is designed for fillet welds. "Jetweld 2" (E-6020) is for deep groove butt welds.

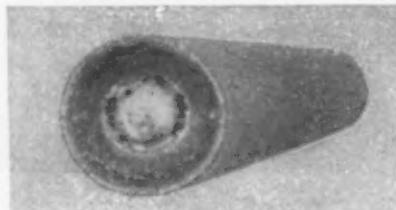


Figure 1. Crucible Action. End of "Jetweld" electrode forms a crucible . . . maintains right length of arc with simple drag technique.



Figure 2. X-Ray Quality. "Jetwelds" are self-cleaning. Appearance is smooth . . . resembles submerged-arc welds.

GET FACTS. Speeds and procedures for "Jetwelding" are in Lincoln Bulletin 462, Mild Steel Weldirectory. Write to

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TECHNICAL BRIEFS

DRAWING: Capacity Tripled

Draw bench and annealing setup handle tubes up to 85 ft in length . . . Special loading device speeds output at Huntington Works of International Nickel . . . Unit 300 ft long.

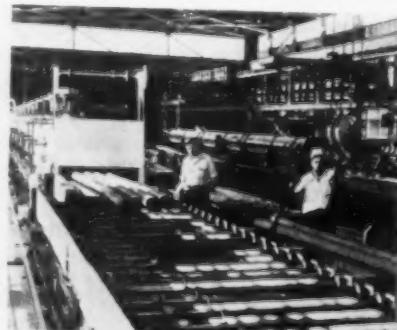
A new cold draw bench and annealing setup features the latest loading and control devices for processing rods and tubes up to 85 ft long. Equipment installation has tripled capacity for producing heat exchanger tubes at the Huntington, W. Va., Works of International Nickel Co., Inc.

Feature of the new draw bench is a unique magazine loading device. It consists of a revolving cylinder in which six mandrels in sets of three each are placed one above the other. While tubing is being drawn from the lower part of the cylinder, the upper three mandrels can be loaded for the next draw.

At the end of a draw, while the "mule" is being returned to start position, the cylinder rotates and brings three tube-loaded mandrels into position before the dies.

Rollers Move Material

The new gas-fired annealing furnace, with charging table, cooling chamber, and discharging table, forms a unit 300 ft long overall. Designed for continuous temperature-controlled annealing of nickel alloy rods and tubes, it is equipped with 300 chain-driven rollers to move material in process.



From annealing furnace . . .

Rollers inside the furnace are constructed of Inconel to withstand 2000°F heat without use of cooling agents.

A dependable control system keeps furnace temperatures at the desired level. Four Leeds-Northrup regulating units, one for each of four furnace zones, control required heat up to the maximum temperature of 2000°F. As a final safeguard against temperature variation, Brown Protect-O-Vane control units signal the operator whenever actual temperatures differ from regulating unit settings.

The new, 85-ft long tube-testing bench is the largest ever built by the Taylor-Wilson Company, McKees Rocks, Pa.

Hardening:

Carbide-coated core rods extend life 30 times.

Core rods, made extremely wear resistant with tungsten carbide coatings, are reported to outlast uncoated rods by at least 30 times. In a Midwestern plant, steel core rods produced only 10,000 parts before wearing beyond the 0.0001 in. limit.

In the same plant, a core rod

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 183. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

lated with Linde Air Products Co.'s Flame-Plating process had, at last count, produced almost 100,000 parts with no sign of appreciable wear. When the rod does wear undersize, the thin tungsten carbide coating can be removed and reapplied. This process can be repeated indefinitely if necessary.

Saves Tool Costs

Substantial savings in downtime and replacement costs are achieved by depositing these tungsten carbide coatings on the surfaces of parts and tools where extra wear-resistance is required. Application of the coating retains the toughness of the base metal which minimizes breakage problems.

Handling:

Better bin design improves solid material flow.

Bulk materials do not always flow readily out of bins and hoppers and through processing equipment. Little basic work has been done to determine conditions governing flow of bulk solids and no comprehensive design method is available to assure the engineer that his design will perform satisfactorily.

Design For Flow

To correct this situation, A. W. Lenike, Salt Lake City materials handling consultant, reports progress on a method aimed at putting design for flow of bulk solids on a quantitative basis.

Theory of solid flow can be stated briefly as follows: A loose bulk solid has no strength, it slips through one's fingers. But in a bin, under pressure, the solid compacts and builds up strength. When the gate is opened or the feeder started, support conditions of the mass are changed with resulting pressure redistribution. If the new pressures are higher than the strength of the mass, the solid flows, otherwise, an obstruction develops.

Gages Test Pressure

A novel pressure gage has been developed and used to measure



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pressure within material. Pressure tests in a sand-filled hopper were significant. The gages were placed to measure vertical pressure along the centerline of the hopper.

Unit pressure increases linearly from the top of the filling down to a certain height where it reaches a maximum. Pressure then falls off toward zero at the hopper apex. This behavior is typical of bulk solids and is confirmed by industrial experience. Actually, if pressure in a solid increased linearly all the way down the bin as it would in a liquid, feeders would be severely overloaded and would require much more power to operate.

Pressure Drops Abruptly

Next, the pressure gages were similarly placed in a bin. Curves show that in the vertical portion of the bin pressure increases with depth down to the hopper transition. At this point pressure drops abruptly, then picks up again within the hopper.

As a result, unit pressure in the hopper is practically independent of the solid level in the bin. This explains why, in so many cases, solid flow through a hopper is unaffected by the solid level in the bin.

Measure "Flow-Factor"

Another step toward a quantitative design method has been made by deriving formulas for bulk solid flow, plus determination of a property which governs flowability. The property, called the flow-factor, is obtained on apparatus developed for this purpose.



Shear test machine . . .

TECHNICAL BRIEFS

use and used in the studies. It is a transverse shear testing machine to measure effective cohesion and angle of internal friction from which the flow-factor is computed. This machine can also measure unit weight of a solid as well as adhesion and angle of friction between a solid and a bin wall.

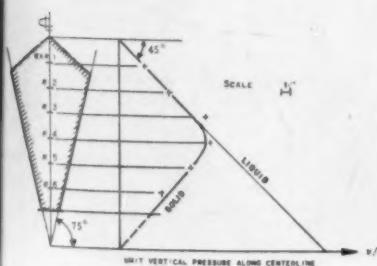
From the work done on quantitative design data thus far, several practical conclusions can be stated. It is important to keep compacting pressure within a material as low as possible. The higher the pressure, the more strength a solid builds up, and the more it tends to obstruct flow.

Hopper Opening Critical

A sufficiently large hopper opening is necessary to assure flow. Size of the opening depends on the other bin dimensions and on the flow-factor of the solid. Formulas of flow relate these quantities. When fully developed, they will allow design with a good degree of performance certainty.

Material fed into a bin falls a certain height, gains momentum, and hits with a compacting force which tends to wedge the mass within the hopper. Wedging produces the high lateral pressure which leads to obstructions. To a degree, the steeper the hopper, the more severe is wedging.

Fine and flaky materials, which are adequately braked by air friction, do not wedge and flow best in very steep hoppers. The hoppers can reduce to small openings with inexpensive gates or feeders. For other materials, hopper slopes should not exceed 60° and, if wedging occurs, horizontal ledges can be mounted to increase wall

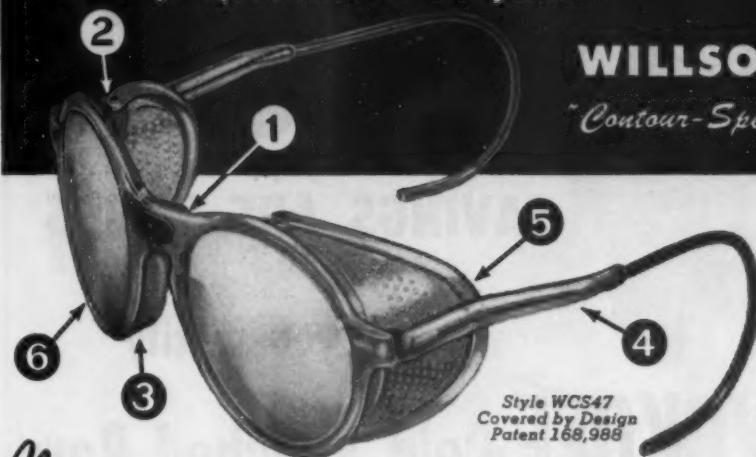


Effect of pressure . . .

first really new development in safety spectacles in years!

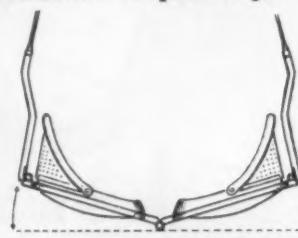
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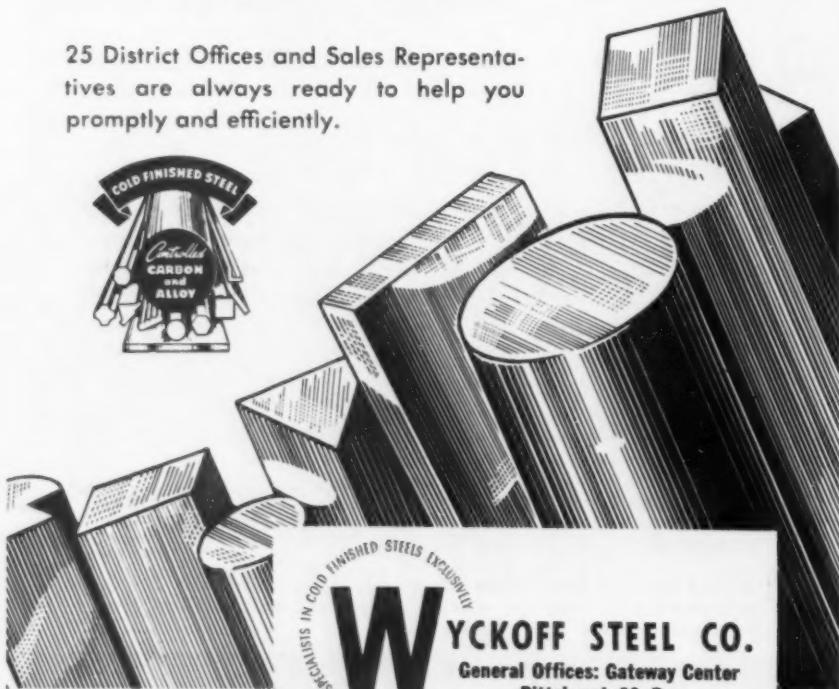
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friction. When self-clearance is necessary, the ledges can be inclined at an angle of 45° and vibrators used for final clean out.

Material Forms Crater

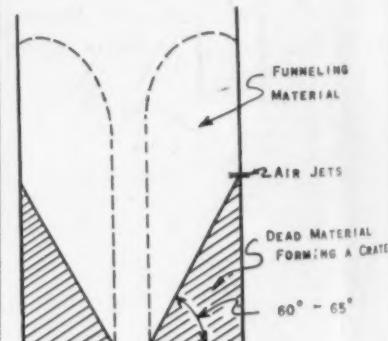
When self-clearance is not required, flat-bottom bins are satisfactory. Dead material compacts around the opening to form a natural hopper or crater which controls wedging and produces smooth flow. Compaction of the dead material may take days or even weeks. During this initial period, flow is erratic but improves once a firm crater has formed. Pre-compaction by mechanical means can eliminate this difficulty.

The dead material of the crater should not be disturbed by barring, air jets or vibration. When air jets are required to break up funneling, they should be located above the crater. Suspension bunkers are flexible, tend to disturb the dead material of the crater and are less conducive to flow than rigid bins.

Pressure Domes Material

Sometimes material will dome due to excess pressure at the transition from the vertical portion of a bin to the hopper. To reduce the pressure in this area, support should be added to the mass of material above the transition. This is done with horizontal ledges in the bin or with vertical partitions to reduce bin diameter.

When moisture content of the solid varies, it is necessary to measure the flow-factor for the whole range to determine the critical condition.



Place above crater . . .

TECHNICAL BRIEFS

Jet Barrier:

Safety device protects both pilots and jet planes.

Remote control will be built into runway barriers now being built for the Air Force by Acme Aluminum Alloys, Inc., of Dayton, Ohio. The barriers, used effectively in Korea and Japan, bring jet fighters to a safe stop when a normal stop cannot be made on the runway.

Principal improvement in the barriers being built by Acme is the remote control feature.

Tower Operated

If a plane is in danger of overshooting the runway on either takeoff or landing, a control tower operator can raise the barrier within one and one-half seconds. This refinement uses an air cylinder with electrically-maintained air pressure to raise and lower the barrier.

Basically, each barrier consists of a nylon web and a steel cable affixed to two long anchor chains weighing 10 tons each, and attached to upright steel stanchions on each side of the runway.

To A Smooth Stop

When the barrier is raised, the web is 3 feet above the runway where it can engage the plane's nosewheel strut. This raises the cable to the bottom of the fuselage, where the main landing gear struts are engaged.

Shearing pins then free the cable from the stanchions, and the cable drags the chains. This brings the plane to a smooth stop within several hundred feet.



Stops jets fast . . .



YOUR industrial distributor can tell you many ways in which you can save money by using Bunting Bronze Bearings and Bars and the other material and equipment items he sells.

He has selected each of the countless things in his stocks after careful study and comparison, seeking those which will do the most for you.

YOUR BUNTING distributor is the leading industrial distributor, or a stock-carrying specialist in certain industrial items. With money-saving convenience, he can supply hundreds of different sizes of completely machined and finished Bunting Standard Stock Industrial Bearings, Electric Motor Bearings and Precision Bronze Bars.

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Catalog which gives
complete dimensional
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Branches in Principal Cities • Distributors Everywhere

Pulp Tank
prepared for
Plastic Lining

TECHNICAL BRIEFS

Welding:

New method so simple,
everyone can use.

A welding method that eliminates the need for skill shows promise of extending into the home fix-it-yourself trade. The method is useful to business and service establishments, repair shops and other users of metal equipment and machinery that occasionally need a quick, easy method of repair or maintenance.

The Lincoln Electric Co., Cleveland, O., has developed the new method, to create a quick, fool-proof welding method, usable by everyone. Called Selfweld, this method uses a simple, inexpensive 100-amp welding machine.

Electrode Does the Work

The method eliminates the difficulties normally encountered by the inexperienced welder in manipulating the welding electrode and controlling the arc. The new method employs a special welding electrode and special electrode holder.

To make a weld, the tip of the electrode is simply held against the metals to be joined at the point where the weld begins. A switch on the holder is then pressed to fire the electrode, and the electrode automatically makes the weld. The electrode and holder normally do the work required of the person welding.

Locating the beginning of the weld, starting the arc, feeding the electrode, the electrode angle and the travel speed are controlled automatically by the design of the electrode and holder. A supporting leg on the holder can be used to help locate and steady the electrode on the joint, and to control the angle of the electrode.

The coating of the electrode touches the work at all times so that the arc length is automatically controlled.

The welding machine, called The Lincwelder 100, can be operated safely on the properly fused 115- or 230-v circuit.

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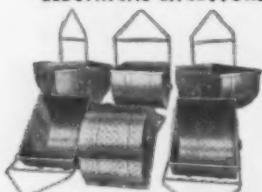
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Literature on request:

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"ELECTRICAL ENCLOSURES"



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for the makers of

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No matter what you make that farmers use, chances are Van Huffel Cold Formed Metal Shapes and Tubing can help you make it faster, cheaper and better.

Faster because cold formed parts require very little or no machining; parts come to you shaped, cut, punched, or bent to your specifications.

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Better because of the wider latitude in choice of materials, design possibilities and fabrication methods. Shapes and tubing can be produced in Cold Rolled, Hot Rolled and High Tensile Steels. Van Huffel cold forms strip metals $1/2"$ to $33"$ wide; regular and irregular shapes in .018 to .312 gauge; tubing from $3/16"$ to $6"$ in diameter in any lengths.

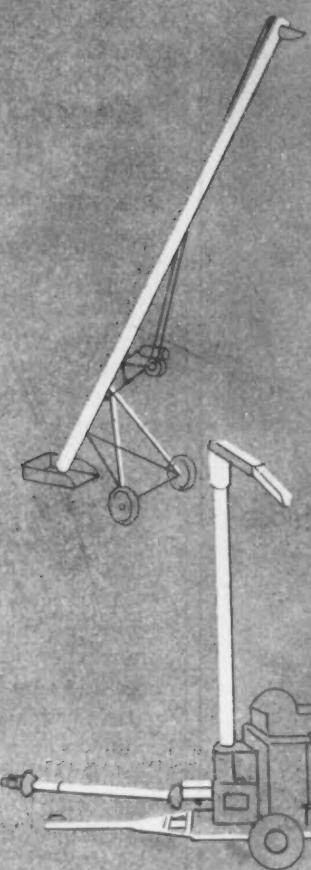
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Van Huffel

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Where ideas take shape
for makers of farm equipment

ARCOS

FOR FINEST
QUALITY WELDS



New Arcosite flux now makes possible submerged arc welding of stainless

Now you can enjoy full economy from submerged arc welding of stainless steel. New ARCOSITE FLUX and ARCOS CHROMAR (Stainless Steel) WIRE make this possible for the first time.

One reason for this is the skillful formulation and manufacture of ARCOSITE FLUX. Carefully controlled particle size of the flux assures you uniformity of arc action, alloy recovery, bead penetration and shape, and easy flow through flux feeding devices. Combined with the controlled analysis of ARCOS CHROMAR WIRE you get the advantages you need for successful welding: Mechanically sound, corrosion resistant welds . . . freedom from cracking . . . positive transfer of essential stainless elements. Write today for new Arcosite Flux Bulletin. Arcos Corporation, 1500 South 50th Street, Philadelphia 43, Pa.

 WELD WITH
ARCOS

STAINLESS WIRE AND ARCOSITE FLUX

Inspection: Isotopes used in small testing machine.

A low-cost system using radioactive isotopes has been engineered to help industry spot imperfections within dense materials. The new Gamma Rays Machines was developed by Gamma Industries, Inc., subsidiary of General Gas Corp., Baton Rouge.

The new units, which permit the nondestructive radiography of dense products at low cost, can penetrate steel plate up to 8 in. in thickness. The units are completely portable and use radioactive isotopes to produce X-Ray-type pictures.

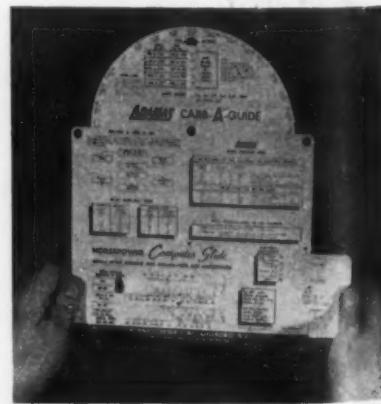
Carbide Data:

Slide chart simplifies
machining with carbides.

Detailed carbide application information at your fingertips is provided in a clever new combination dial and slide chart, the Adamas Carb-A-Guide, now being sold by Adamas Carbide Corp., Kenilworth 4, N. J.

Feed, Speed, Grade

By turning the dial to the type material to be machined the chart shows, for the user's feed and depth of cut, the proper speed, carbide grade, tool angles and chipbreaker dimensions. How to make necessary changes in speed, feed and grade are shown. Also included is a speed conversion slide, a milling feed slide and a horsepower computer slide. The guide sells for \$1.00.



At fingertips . . .

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TECHNICAL BRIEFS

Metal Show:

ASM meets in Chicago

Nov. 1-5 for 36th annual show.

The 36th Annual National Metal Congress and Exposition will be held in Chicago Nov. 1 through Nov. 5. The big Metal Show, sponsored by the American Society for Metals, will be the ninth such event held in Chicago.

The National Metal Congress will be held in headquarter hotels of the participating Societies. The Exposition will be held at Chicago's International Amphitheater, Halsted at 33rd St.

444 Firms to Exhibit

According to W. H. Eisenman, Managing Director, 263,000 sq ft of space will be used for the display and operation of equipment, products, and services being brought to Chicago by leading industrial firms all over the country. Some 444 firms will occupy space in the International Amphitheater when the Metal Exposition opens.

There will be a diversity of interests in the displays and operations at the hundreds of exhibitor booths—ranging from new developments in spot welding to the latest in testing and finishing of metals and metal products. The show will arouse wide interest.

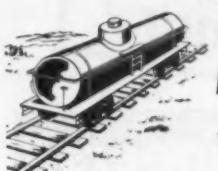
Participating Societies

Participating with the American Society for Metals are three other technical societies directly concerned with advancement of science and engineering in the metals industry. Headquarters for the four societies are: American Society for Metals, Palmer House; American Welding Society, Hotel Sherman; Institute of Metals Division, AIME, Morrison Hotel; Society for Non-Destructive Testing, Morrison Hotel. Technical programs of the four societies will be conducted in their respective headquarter hotels.

Many Sessions Planned

On Saturday and Sunday, October 30 and 31, the American So-

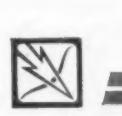
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An important key to success on any aluminum welding job is the quality of weld metal. Newly-developed ARCOS ALUMINUM RODS and ELECTRODES assure you a dependable answer to this requirement. They give you the properties you need to make the most from aluminum's durability, strength, appearance and maintenance-free qualities. Specify Arcos for profitable aluminum welding. Arcos Corporation, 1500 South 50th Street, Philadelphia 43, Pa.



WELD WITH
ARCOS
ALUMINUM RODS AND ELECTRODES

society for Metals will hold its annual Seminar. Morning and afternoon sessions will discuss the 1954 subject "Imperfections and Impurities."

Beginning Monday, Nov. 1, the ASM and the American Welding Society will hold morning, afternoon, and evening technical sessions at their headquarter hotels. The Institute of Metals Division, AIME, will hold daily and evening technical sessions Monday through Wednesday. The Society for Non-Destructive Testing will hold morning and afternoon sessions Monday through Friday during the Metal Show.

The ASM annual Metallographic Exhibit will be held during the entire week of November 1-5. Micrographs and macrographs displayed will qualify their owners for substantial recognition as well as a cash award for the best entry.

Annual meeting of the ASM will be held Wednesday morning, November 3, in the Grand Ball Room of the Palmer House. Annual banquet will take place on Thursday evening. It will feature an outstanding speaker and ASM award presentations.

Tooling:

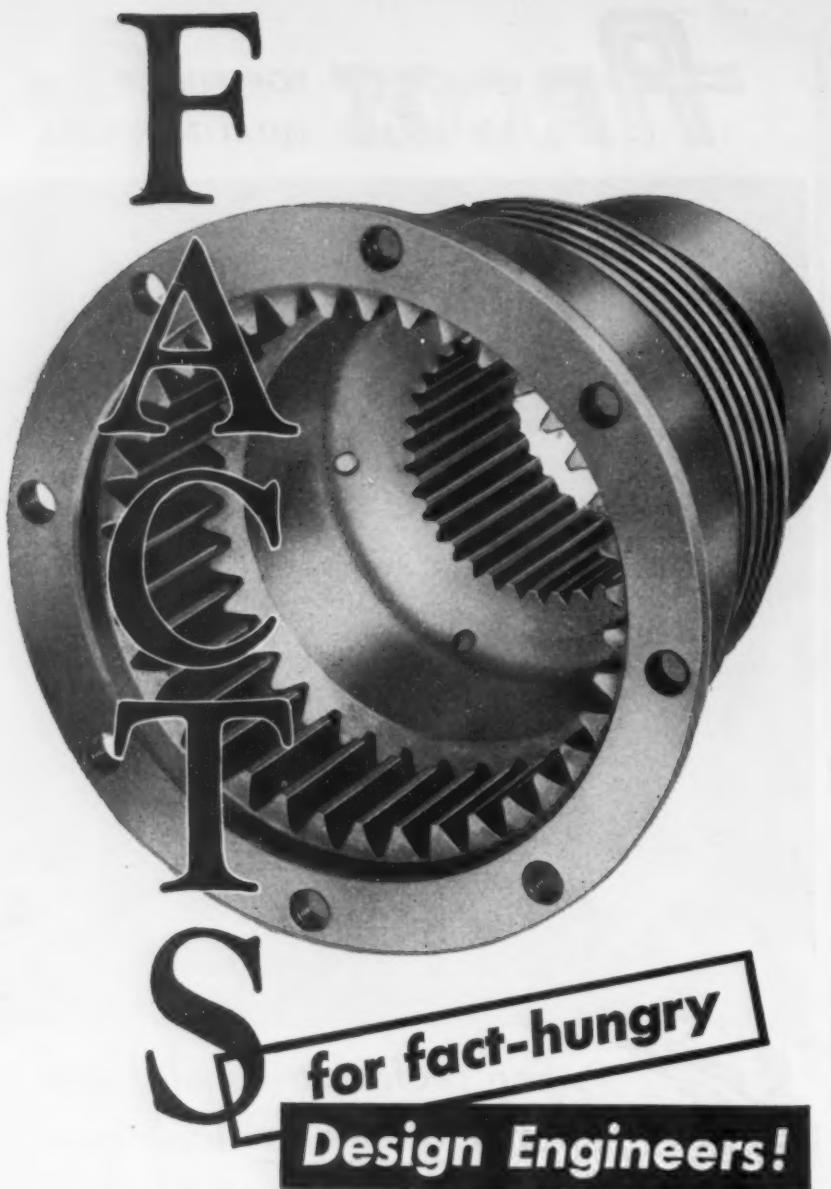
Cast-to-shape stainless cuts tooling costs.

Cast-to-shape stainless steels, a big factor in improvement of television tubes made by the glass industry, may also provide an answer to lower tooling costs in other industries, S. J. Clokey, Asst. Vice President of Jessop Steel Co., Washington, Pa., recently stated.

First Used By Automotives

Originally, cast-to-shape steels were used only in the automotive industry for forming dies, draw dies, and blank and trim dies. About 11 years ago, cast-to-shape steels were first used as molds and plungers in the glass industry.

In an effort to obtain larger



WE do not make and sell gears. We endeavor to "sell" you on our gear engineering know-how and — with your specifications as a base — produce gears which will provide maximum service in accordance with their pre-determined function, operating and environmental conditions and the characteristics of the system of which the gear is a part. Obviously, Perkins' facilities to do all this pre-supposes that our mechanical equipment for production matches our abilities in gear engineering. It does!

PERKINS MAKES in all materials, metallic or non-metallic, and in any size, to your specifications: helical gears, bevel gears, sprockets, ratchets, worm gears, spur gears with shaved or ground teeth, ground thread worms.

*Illustrated above: Typical Perkins custom-made gear

NOTE: The PERKINS PRECISION SPRING COILER is the latest development in the spring coiler field and eliminates entirely the use of arbors and long set-up time. It is a complete self-sufficient machine and enables you to make the spring you want when you want it — in seconds. The coiler produces any type of spring, in any diameter and any pitch with this range: Wire Sizes .005 to .125. Diameter from 3/32" to 12" and larger. Size of the compact coiler is only 7½ x 16". A POWER MODEL mounted on a welded steel console cabinet base is also available. Full information on request.

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TECHNICAL BRIEFS

and clearer television tubes, glass companies asked Jessop to produce molds to more exacting requirements.

Stainless Is Chilled

Since the molds—used to form picture tubes for almost all television sets—must help produce perfect glass, it was necessary to have a sound metal structure, without pinhole porosity, and one which could be polished to an extremely high degree.

After months of research and development in a joint effort with two of the nation's largest glass companies, Jessop Steel developed a process of chilling stainless plungers and molds. This method of producing castings is being carried out on a production basis and has been an important factor in improving the quality of television reception.

Design Governs Chill Type

The design of the mold or plunger which is to be chilled governs the type of chill used. It may be a one-part chill or it may be a number of chills placed in certain positions adjacent to the working surface of the product to be chilled.

To date most of the chills have been made by means of iron but further experiments with chills made from graphite and steel are being made. Time, as well as the temperature of the molten metal, plays a very large role in this method of producing castings.

In chilling stainless steel it is possible to control the grain size to a depth of 1.5 in. under the chilled surface. This provides a big factor of safety to user of this material since dies or molds can be continually worked without the possibility of working into porous metal or hitting blow holes and shrinkage cracks.

Cuts Tooling Costs

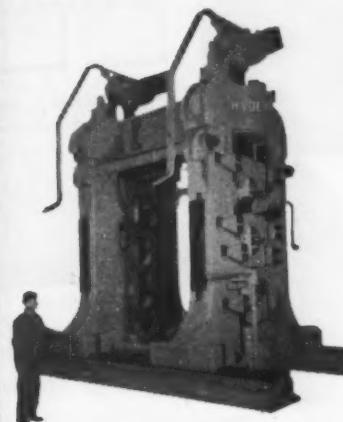
This may in time answer current problems of the diecasting and plastic fields. Today these two industries make their molds principally from large forged blocks. When cast-to-shape steels

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TECHNICAL BRIEFS

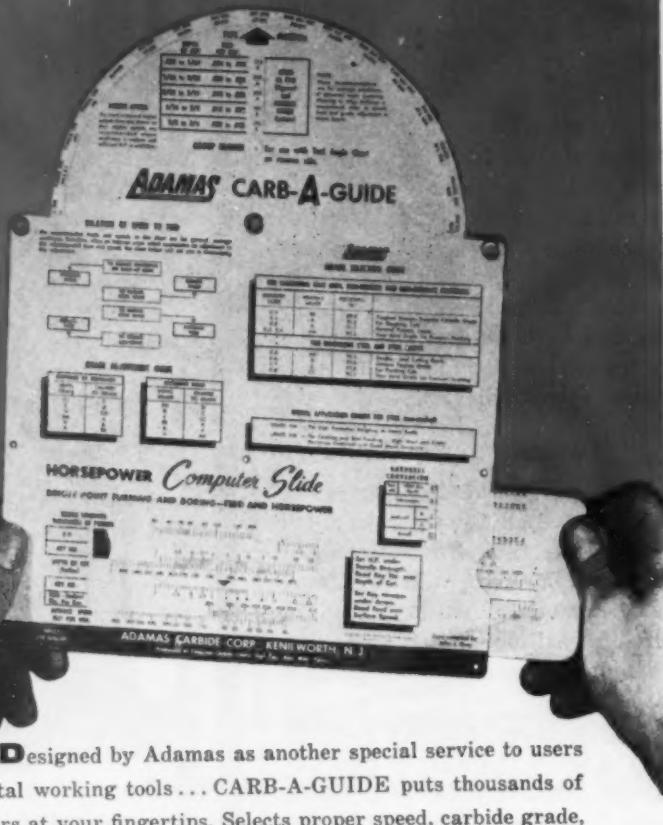
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are used, less weight is purchased, less machining is necessary and usually the purchase price is under that of a similar piece of forged material with a similar analysis.

Cast-to-shape steels are also used extensively in tube forming, deep drawing of aluminum and stainless steel—as in jet engines, in the appliance field, the utensil industry, agriculture and, in fact, almost any industry where high production on sheet metal dies is required.

Greater Output Per Tool

These steels, cast to requirements, give outstanding service in many applications. For example, a fire brick manufacturer produced 1,220,000 silica fire bricks on cast-to-shape press liners before a regrind, compared to 250,000 bricks from another material.

Cast-to-shape steels are made by Jessop to precise laboratory standards in electric furnaces. Very little stock has to be removed for finishing. And additional material savings are made possible by coring to provide hollow walls and by casting reinforcing ribs on high, thin walls.

Loader:

Mobile unit handles 60 tons per hour.

More rapid handling of granular materials is reported possible with a portable two-screw conveyor recently developed. The unit, containing a hydraulically controlled elevating screw, is adjustable to heights from 6 to 16 ft. It was developed by Delta Tank Mfg. Co., Inc., of Baton Rouge, La.

Powered by a two-cylinder engine equipped with self-starter, clutch and gear-reduction unit, the loader may be moved into position wherever needed. The mobile unit has a 60 ton per hour capacity.

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"Shaw-Box" CRANES

MANNING, MAXWELL & MOORE, INC. Muskegon, Michigan
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New Films:

Welding of aluminum described in Alcoa film.

"Welding Advances With Aluminum." Comprehensive description of welding aluminum using both tungsten arc and consumable electrode methods is given in 28 minutes 16mm film. Basic concepts of both tungsten arc and consumable electrode welding are explained in an animated sequence. Available for group showings. Motion Picture Section, 818 Alcoa Building, Pittsburgh 19, Pa.

"Mr. Glasfab Goes Topside." Story of industrial roof maintenance and a new cost-saving procedure are explained. Shows how to repair blisters, cracks and other roofing damage. Sound film takes 18 minutes, is 16mm and in color. Twinsburg - Miller Corp., Twinsburg, Ohio.

"The Heart of The Matter." Film, 22 minutes, 16mm sound Kodachrome, deals with the subject of stresses in finishing tools. Film shows principal steps involved in the production of high alloy steel, from raw material to finished product. Available upon request. Latrobe Steel Co., Latrobe, Pa.

"Multipress—and How You Can Use It." 16mm sound, 30 min black and white film that discusses the Multipress and its operating characteristics in detail.

"Blanking and Forming." Black and white sound 16mm, 10 min film showing on-the-job production scenes in detail high speed and multiple stage blanking and forming operation performed by Multipress.

"Index to Profits." 16mm, 20 min black and white sound film describes the use and design features of the Denison Hydraulic Index Table. Write to Denison Engineering Co., 1160 Dublin Rd., Columbus, Ohio, for these films.

TECHNICAL BRIEFS

Machinery:**New carbide reduces chipping and flaking**

Automatic lathes machining truck axles in a Detroit automotive plant are producing better than one-third more axles between tool grinds using the new 350 grade cemented carbide developed recently by Carboloy Dept. of General Electric Co. Chipping and flaking, biggest problems encountered with carbides on this particular job, were reduced considerably when the new carbide was applied.

Axle itself is an AISI 4150 steel forging, measuring 48 in. long, 4 in. diam on the end that supports the brake drum, and 2 in. diam on the spline end. The job consists of machining both the front and back faces of the part that is toward the brake drum, the outside diameter of this flange, the bearing and spline diameters.

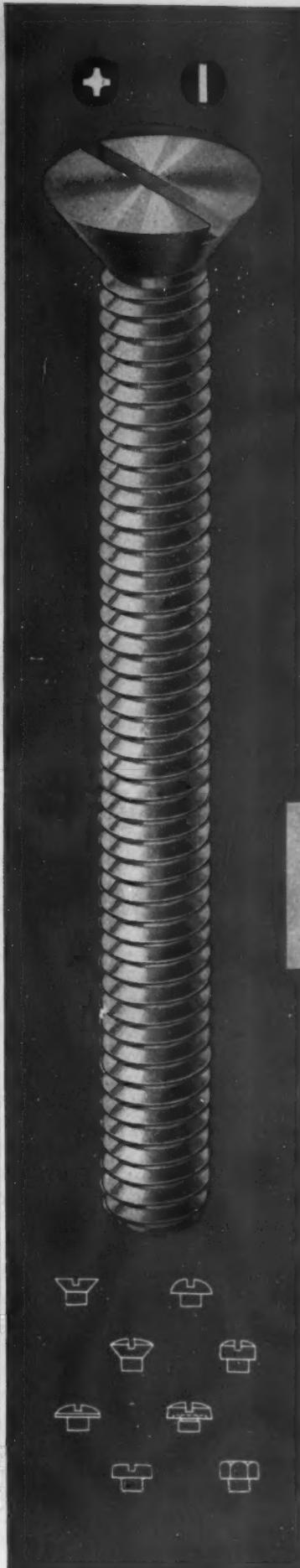
From Front and Back

The machine cycle starts after the operator places the work between two centers and lowers the rest guide in position on the axle in the lathe. Coolant begins to flow as the machine is actuated, and the tools move into cutting position to machine the flange outside diameter, both the bearing and spline diameter. In the second cycle the tools work on the front and back faces of the flange, automatically retracting when the operations are completed. Following the third chamfering cycle the axle is removed.



Turning axle shaft . . .

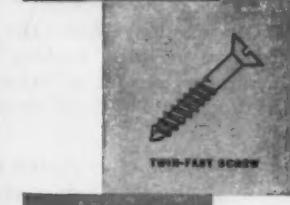
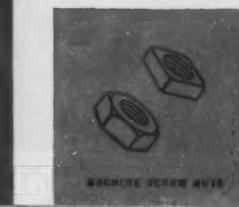
September 16, 1954



Whatever type of machine screw you need, Blake & Johnson has it... or can make it for you.

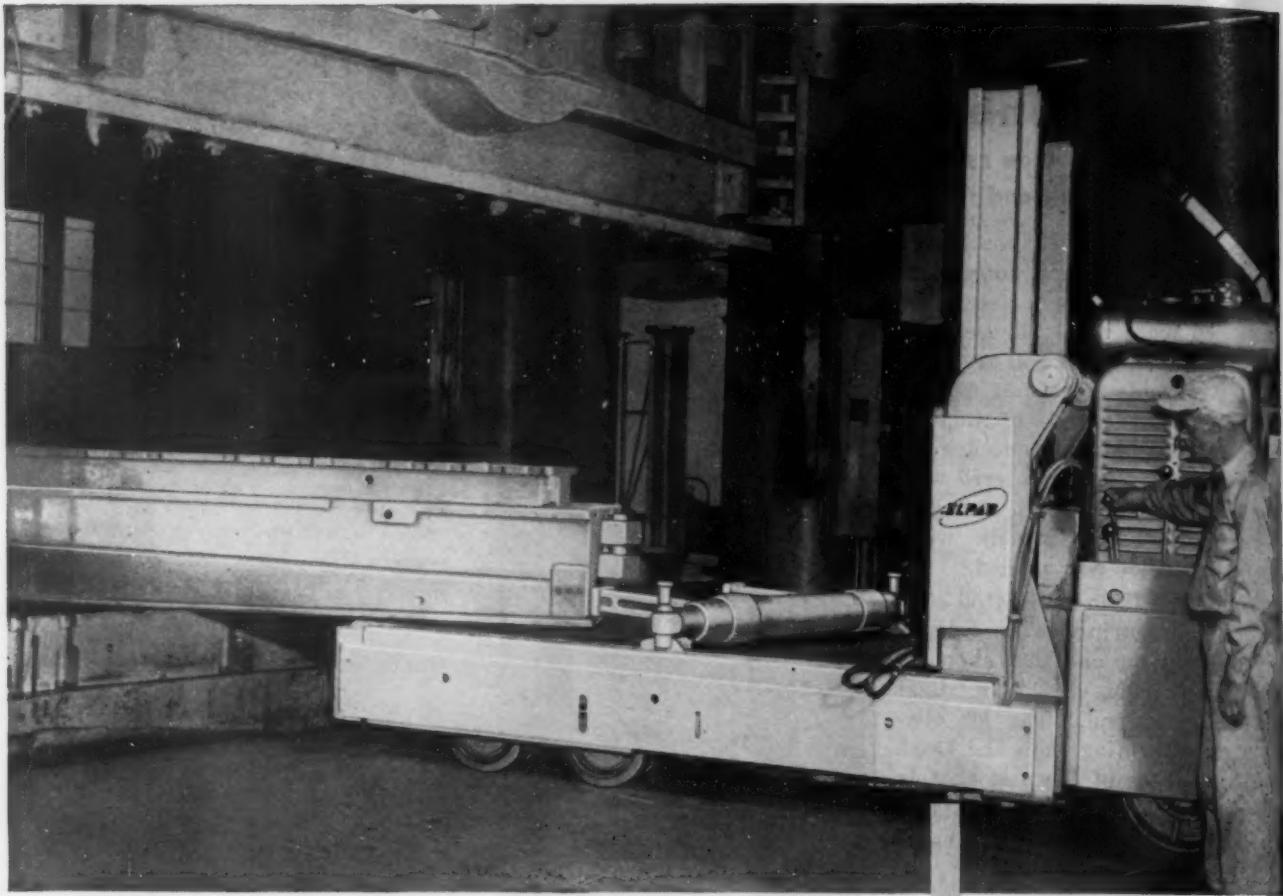
Slotted or Phillips heads — in brass and steel, plain or plated. Special designs, sizes, and finishes to order. Blake & Johnson is the dependable source for Twin-Fast® wood screws, stove bolts, tapping screws, special headed products, machine screw nuts, rivets, chaplets, wire forms, automatic screw machine products . . . in steel, brass, or other alloy metals.

Write for new catalog ▶



fastenings

BLAKE & JOHNSON
SINCE 1849
WATERVILLE 48, CONNECTICUT



Exclusive Features of NEW **ELPAR*** Die Handler *Speed Die Changing*

Fast changing of stamping and forging dies is a "must" to keep waiting time of huge presses at a minimum. The entirely new line of ELPAR die puller trucks handles 5 to 50-ton dies with unmatched speed and safety. Here are some of the reasons:

FINGERTIP CONTROL—Exclusive hydraulic operation of both lift and die pulling mechanism permits "inching" action. Hydraulic valves can be barely cracked to permit accurate positioning of platform and alignment of die in press. Such exactness is impossible with electric controls.

INDEPENDENT OPERATION OF PUSHER ARMS—Pusher arms can operate together or separately to maneuver die. If necessary, a die can be pushed off diagonally even when platform is not square with press bed. This saves time of maneuvering truck. Die can be turned as it is pushed into press.

LOWER PLATFORM—Because today's press beds are lower, ELPAR trucks provide lowest possible platform with no sacrifice in capacity.

FULL VISION—No lift chains or cables between uprights, and no cross member at top. End control permits view of entire truck.

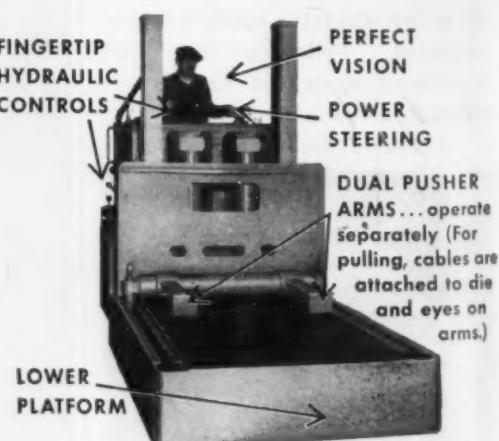
MANEUVERABILITY—Effortless hydraulic power steer. Short turning radius because all wheels steer.

*New Elwell-Parker trade name.

THE ELWELL-PARKER ELECTRIC CO.
4298 St. Clair Avenue
Cleveland 3, Ohio

ELPAR truck in Lockheed aircraft plant. Note that operator is using remote controls. Die is being turned as it is pushed into press. In only 8 minutes, truck picks up from storage, delivers, and positions a multi-ton die!

ELPAR FEATURES:



ASK FOR FULL FACTS ON NEW ELPAR DIE PULLERS

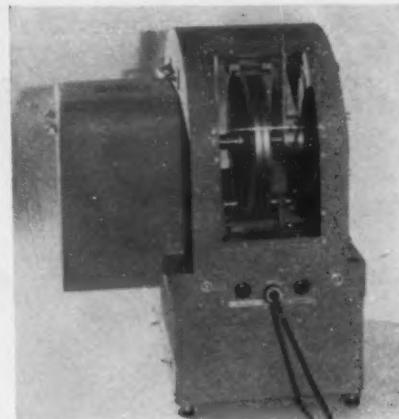
NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies...for more data use the free postcard on page 183 or 184

Memory device in control unit for continuous gaging

The Proportional Synchronizer is a device for storing a meter reading of varying magnitude and reproducing that information at a later period in a process, synchronized with the speed or movement of the processing line. In operation, a meter reading from a gage is applied to the memory unit through a self-balancing Electronic Control Circuit. The device storing this reading is driven from the process line in the same rela-

tion that the material is progressing through the process, and the advancement of information is in relation to speed and distance. Applied to steel strip of varying thickness, being formed into tubing and seam welded, the instrument conveys information on thickness between the points of measurement and welding; controls welding current accordingly. *Pratt & Whitney.*
For more data circle No. 31 on postcard, p. 183.



Deep heat penetration for forging, annealing, brazing

A motor generator control and heating station incorporates new features for forging, hardening, brazing or annealing operations where deep penetration of heating is desired. Motor generator sets with frequency cycles of 960, 3000 or 9600 and power inputs ranging from 50 to 1250 kw are available for use with the station. Station design enables metering to be located on either the front, right or left side, visible to operator regardless of where accessory equipment

is placed. Output transformer can be installed or removed through either front or rear of the station. A supervisory system of Checklites maintains a constant check on air temperature, water temperature, high voltage interlocks, water flow and other operating conditions of both motor generator and work stations. Operations may be timed automatically by means of a 4-circuit synchronous timer. *Lindberg Engineering Co.*

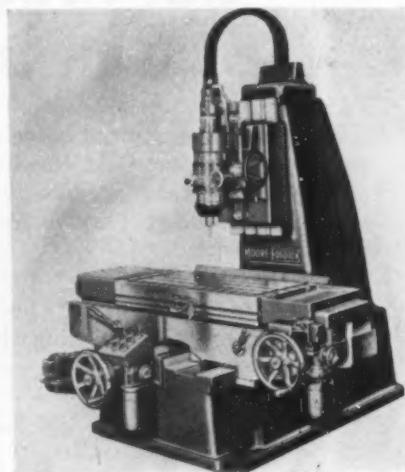
For more data circle No. 32 on postcard, p. 183.

Automatic positioning table speeds up jig grinding

New jig grinding machine called the Moore-Fosdick jig grinder is the result of combining the Moore jig grinding head with the Fosdick automatic positioning table. This makes it possible to get greater capacity for precision grinding with the speed and convenience of a table that automatically positions work to ± 0.0001 in. A special feature of the machine is its ability to grind cylindrical and tapered holes. An angular and indexing device built into the main spindle

and a slot grinding attachment permit quick, accurate grinding of any contour—regular or irregular. An infinite range of grinding speeds runs from 12,000 to 60,000 rpm, allowing more accurate control of grinding and stock removal. Maximum work size for the grinder is 22 x 42 x 27 in. height. Machine also includes four spindle speeds: 90, 120, 180, 240. *Fosdick Machine Tool Co.*

For more data circle No. 33 on postcard, p. 183.
Turn Page





Get Production, Economy, Quality with J&L Cold Heading Wire

More and more profit-conscious wire users are turning to J&L for Cold Heading Wire that helps them get increased production, top quality and operating economy. They've found that J&L furnishes wire with—

- High Plastic Deformation • The Right Finish
- High Cold Malleability • The Utmost Uniformity

... in other words cold heading wire that consistently

has the right chemical and physical properties.

The dependability of J&L Cold Heading Wire is the result of quality control from ore to finished product, rigid testing, modern equipment and over a hundred years of iron and steel-making experience.

Contact J&L and investigate the economies of using J&L Cold Heading Wire in your operation. Remember, it's tops in quality—competitive in price.

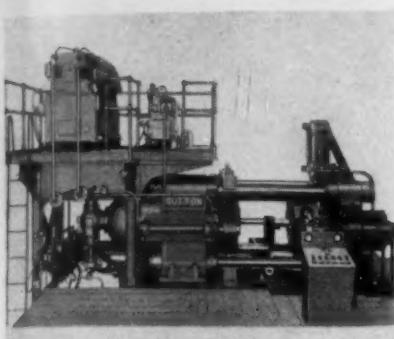
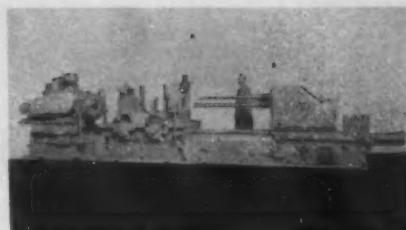
Jones & Laughlin
STEEL CORPORATION — Pittsburgh

Features simultaneous boring and facing operations

The new Natco machine, which employs two heads, speeds production of diesel engine blocks by finish boring cam and crank holes and boring and cross-feed facing flywheel case simultaneously. At 85 pct efficiency, it completes 4.3

parts per hour. Close tolerances are made possible by the built-in accuracy of the Boreface and because all operations are performed with one locating of the part. *National Automatic Tool Co., Inc.*

For more data circle No. 34 on postcard, p. 183.



Press extrudes aluminum, brass and copper shapes

In the manufacture of a new 750-ton horizontal, direct-powered extrusion press for aluminum, brass or copper shapes, bars and tubes, emphasis has been placed on more pay load, less maintenance, ease of operation and rugged construction. Features of the press include extra fast cycling; positive billet loading; easy die change; heavy duty

shear of extra high capacity; sensitive control of the main ram; and other similar aids to users. The press will take a pre-heated aluminum, brass, copper or magnesium billet 4 7/16 in. in diameter and will extrude solid strips, rod and hollow or semi-hollow sections. *Sutton Engineering Co.*

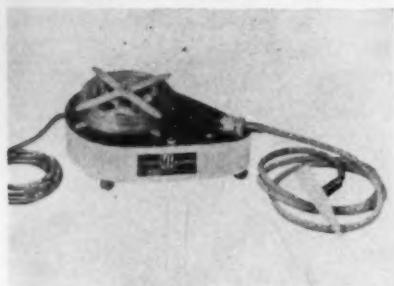
For more data circle No. 35 on postcard, p. 183.

Workshop on wheels speeds up maintenance jobs

The Shopmobile, a self-propelled mobile workshop on wheels, carries all maintenance tools, supplies, parts, equipment right to the job. Powered by a gasoline engine, the Shopmobile features a steering handle that also operates clutch and brake; actuates the clutch when lowered to moving

position; declutches when raised; applies the parking brake when returned to the vertical position. Work-bench surfaces of checker plate steel are provided at working height on top of side compartments. Capacity is 800 lb. *Stahl Metal Products, Inc.*

For more data circle No. 36 on postcard, p. 183.



Combines advantages of hand and automatic welding

New MF welder regulates arc and wire feed automatically; retains visibility and flexibility of manual welding. It feeds bare wire through a hand-held hopper containing magnetic flux. This flux clings to the wire as it leaves hopper so that the electrode wire reaches the arc with a flux covering that contributes the

advantages of a manual electrode coating. The MF does not obsolete basic welding equipment as it is easily connected to any conventional ac or dc welding machine and operates over a current range of 150 to 500 amp. *American Brake Shoe Co.*

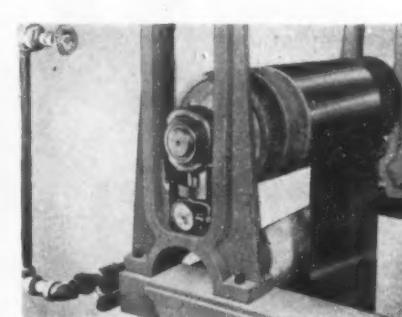
For more data circle No. 37 on postcard, p. 183.

Tinplate strip tension measured with pressure gages

Two Dillon mechanical pressure gages are utilized by Crown Cork & Seal Co. in measuring tension of tinplate strip. The strip passes up over a roller and down, this 180° turn creating a tension double that is exerted on any one portion of the strip. Since a pressure gage is positioned at each end of the roller,

the combined readings of both gages are halved to obtain the exact strip tension. Allowance is made for the tare load of the roller weight. The test is applied periodically at various points wherever tension must be ascertained. *W. C. Dillon & Co., Inc.*

For more data circle No. 38 on postcard, p. 183.
Turn Page



C-F LIFTERS

C-F Lifters give you the fastest, cheapest and safest way to handle loose or bundled sheet steel or plate. 1 man operation saves labor; infinite adjustments of Lifter jaws permit it to handle many widths of steel . . . wide carrying angles hold packs securely, won't damage even highest grade sheets. C-F Lifters are made in standard and semi-special models with capacities from 2 to 60 tons.



**SAVE TIME...
LABOR...
MATERIAL...**

Write for Bulletin SL-28. It describes and illustrates C-F Lifters money and time saving advantages.

CULLEN-FRIESTEDT CO.

1303 SOUTH KILBURN AVENUE • CHICAGO 23, ILLINOIS

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SESSIONS

HOW

STAMPED ASSEMBLIES

SAVE TIME & MONEY

Send samples or prints for quotations on special stampings and sub-assemblies.

Write for bulletin and prices on standard and special case hardware.



J.H.
SESSIONS
E.SON

290 RIVERSIDE AVENUE • BRISTOL, CONN.

Portable loading dock

Motor trucks may be loaded or unloaded from ground level with a new portable loading dock. It can be rolled by two men up to the tailgate of over-the-road trucks. A hand truck is drawn onto the dock's elevating platform and raised to



the level of the motor truck bed. Unit loads are then drawn onto the loading dock and lowered to the floor where they are transported to storage or production areas. Capacity of dock is 6000 lb. The battery of ac powered hydraulic elevating mechanism will raise loads up to a maximum height of 56 in. *Raymond Corp.*

For more data circle No. 39 on postcard, p. 183.

Telephone exchange

Automatic dial telephone exchange requires no costly line or cutoff relays, no-push-button operation, no separate power supplies. The exchange handles all the operation normally requiring a bulky switch-



LEWIS
TRAVEL-CUT
automatic, high-speed
heavy-duty
WIRE STRAIGHTENING
and
CUTTING MACHINES
Sizes for .012" to 3/4" WIRE
ROUNDS & SHAPES
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Turn to pages 2 and 3 of The Iron Age every week and let the

Digest of the Week in
Metalworking

help you find your favorite features.

**IT PAYS TO READ
IRON AGE ADS TOO!**

board and its operator. The system requires only two wires from each phone station to the exchange. Power is supplied by plugging the exchange into any convenient 110 v ac outlet. Primarily designed for intercommunication, this exchange can be tied in with truck lines wherever the telephone company permits. *Bliss Electronic Corp.*

For more data circle No. 40 on postcard, p. 183.

NEW EQUIPMENT

Spray decorating

New gun pressure contact spray decorating machine for painting areas up to 3 x 1 1/4 in. has a capacity of 1500 pieces per hr, depending on shape and size of part. Placing the part into the mask and depressing the table top about 1/4 in. starts the paint operation. A



timer controls the length of time that the gun is spraying so that exactly the same amount of paint is applied to every piece regardless of the rate of operation. The mask measures 4 x 8 in. and is held in place by swivel spring tension clips. The gun is adjustable to several positions. *Conforming Matrix Corp.*

For more data circle No. 41 on postcard, p. 183.

Machine mounts

Heavy machinery can be installed and leveled in a matter of minutes with the larger Leveling Barrymount, the LM7, which carries up to 10,000 lb per mount. The bolts are adjusted with a hand-wrench



until all four magazines are at the proper height. In addition to mobility, Barrymounts offer plants low installation and maintenance costs; less wear and tear on adjacent machinery and on the plant structure itself. *Barry Corp.*

For more data circle No. 42 on postcard, p. 183.



We carry large stocks of beams, channels, and angles (in standard and special sizes) and plates, sheets and cold-finished bars.

Or, a complete job in steel can be fabricated to your "specs" through our modern engineering and plant facilities.

Why not put Levinson service to the test?

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NATIONAL DISTRIBUTORS FOR THE LEVINSON STEEL COMPANY

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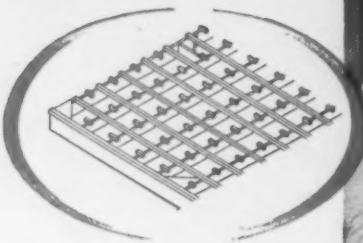
Central Ohio Warehouse—387 So. Market St., Galion, O.

ROLLOCK

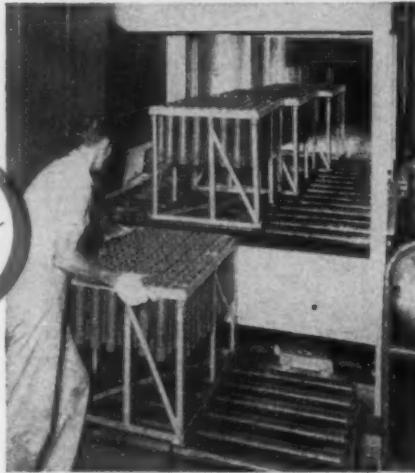
FABRICATED ALLOYS

UNIQUE RACK DESIGN WITHSTANDS

TOUGH HANDLING



. . . at Clayton & Lambert Plant



The Ordnance Division of this Louisville, Ky., plant uses Rolock fabricated Inconel racks for transporting steel shell cases thru a wash, pickle, rinse and taper lubricant application, prior to final tapering operations. The $33\frac{1}{8}'' \times 24\frac{1}{4}''$ wide top of the rack provides square spaces for inserting a 175-lb. load of 96-40MM cases, suspended mouth-down on the case flange (see drawing above). Solution temperatures are 160° to 180° F., and an alternate cycle includes annealing thru a gas-fired furnace at 725° to 750° F.

The user states that "the racks get quite a bit of rough handling." Well, what Rolock does is to design and fabricate equipment to stand up under "rough handling" . . . to meet the exposures required in heat treating and processing operations . . . and provide longer work-hours to reduce unit costs.

We offer you Catalogs B-8 and B-9 with up-to-the-minute information valuable to your heat treating and metal processing departments. Copies on request.

SALES AND SERVICE REPRESENTATIVES FROM COAST TO COAST

ROLLOCK INC. • 1362 KINGS HIGHWAY, FAIRFIELD, CONN.

JOB-ENGINEERED for better work
Easier Operation, Lower Cost

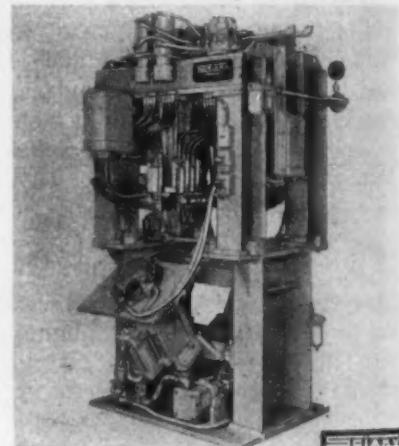
7RL54B

Aluminum paint

Improvement in the adhesive and appearance qualities of Heat Rem H-170 extra high heat resistant aluminum paint is the result of using a new combination non-leaving and leafing aluminum in the paint compound. The non-leaving particles are said to remain suspended in the H-170 vehicle and to provide a uniform quantity of aluminum throughout the applied paint coat. Virtual fusion of the paint with hot surface metal takes place and forms a protective coating capable of withstanding temperatures of 1700° F. Speco, Inc. For more data circle No. 43 on postcard, p. 183.

Resistance welder

Multiple electrode machine for high production resistance welding applications consists of a universal multiple gun base with two separate platen units. The platen units, operating independently load in extended position; swing in and lift



to the welding position; retract and swing-out for unloading after the welding sequence is completed; permitting multiple spot welding of deep drawn sections. Sciaky Bros., Inc.

For more data circle No. 44 on postcard, p. 183.

Machine, product models

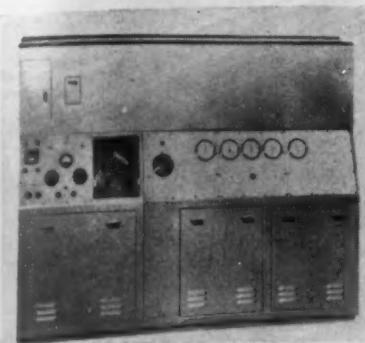
New service specializes in machine and product models in various scales up to life size. Exactly scaled from design prints, these models, finished to exacting specifications, will aid engineers, designers and customers in visualizing the final product. Visual Plant Layouts, Inc.

For more data circle No. 45 on postcard, p. 183.

NEW EQUIPMENT

Spectrometer

The Atomcounter, a direct reading spectrometer incorporates many electronic, optical and mechanical design innovations. The instru-



ment has a double optical system and focal deck so that it may be used photographically for qualitative or semi-quantitative analysis, simultaneously with or alternatively to the direct reading measurements. It is also furnished as a single deck direct reading system for use in the analysis of simple steels and cast iron. Complete analyses normally require less than 1 min. The complete self-contained unit is housed in a metal cabinet measuring 81 $\frac{1}{4}$ x 43 $\frac{3}{4}$ in. Jarrell-Ash Co.

For more data circle No. 46 on postcard, p. 183.

Feeds spool solder

The Scotty electric soldering gun feeds spool solder—acid, rosin or plain—through the upper tube to the hot soldering tip. The solder strip, either 1/16 or 3/32 in. diam, is accurately controlled by trigger action. The Scotty is made of



lightweight aluminum with wedge shape, halfround for copper tubing or pointed soldering tip, the last for use with explosive rivets. Scotco Products Co.

For more data circle No. 47 on postcard, p. 183.
Turn Page

Are you getting
'VALUE RECEIVED'
in Steel Castings?



Similar castings? Yes, but a closer look will reveal many common defects in one.

Quality DOESN'T COST...IT Pays!

After finished costs are compiled, then and only then can you evaluate the quality of a steel casting. Basic cost alone is no "yardstick" for value when accuracy, soundness and other qualifications necessary to economical processing, are not included. Excessive machine work . . . or ultimate rejection due to hidden flaws, can skyrocket finished costs.

Consistently high quality is not achieved by guesswork. Unitcast meets all customer specifications with experience and equipment second to none! Every facility is employed for a specific purpose . . . with a single objective, to deliver the best quality steel castings at the lowest possible price.

Unitcast will assure you "value received". Write or call today! No obligation.

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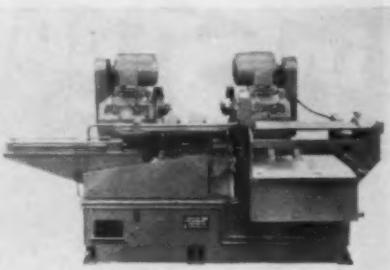


QUALITY
STEEL
CASTINGS

NEW EQUIPMENT

Duplex cropping saw

This machine is supplied with two sawing heads, one right and one left hand, arranged for automatic simultaneous cropping of both ends of an 8-in. shell forging. The sawing heads have nine spindle speeds, multiple disk clutch for engaging



QUANTITY PRODUCTION OF GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866
THE WHELAND COMPANY

CHATTANOOGA 2, TENN.

METAL STAMPING FACILITIES
by *Lansing*
at your service for...

TRANSPORTATION EQUIPMENT

HOUSEHOLD APPLIANCES

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Lansing Stamping Co.
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Shaped Wire TO YOUR "SPECS"

High- and Low-Carbon Steel and Non-Ferrous Wire . . . shaped to your exact specifications.

CHARTER WIRE, INC.

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the spindle drive, and self-contained lubrication system to all bearing points. Shell forgings are magazine loaded from customer's conveyor and individually passed into the loading position by an escape mechanism. Sawing heads cut the excess material from both the base and nose end of the shell forging. *Motch & Merryweather Machinery Co.*

For more data circle No. 48 on postcard, p. 183.

Die pusher-puller

Platform type JackStack is equipped with a hydraulic die pusher and puller. The truck is used for stacking dies weighing up to 7500 lb in storage racks and for transporting the dies from the storage area to the press beds. Platform measures 42 in. long x 32 in. wide. Pushing

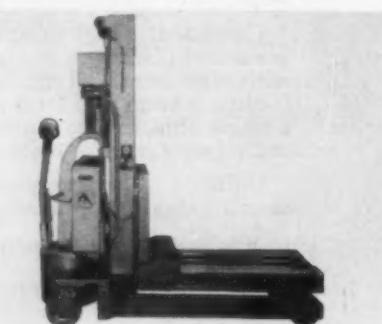


plate has 42-in. stroke; can push dies completely off or pull them onto the platform. Lowered height of platform is 15 in. and raised height 54 in. Truck will right angle stack in 7-ft wide aisles. *Lewis-Shepard Products, Inc.*

For more data circle No. 49 on postcard, p. 183.

NEED COMPONENT PARTS

FOR YOUR PRODUCT?

Find the plant which
can supply them in the

**CONTRACT
MANUFACTURING
SECTION**

NEW EQUIPMENT

Swing riddle

Special purpose riddle for use with all types of molding machines is mounted on a rugged steel base and in operation is positioned alongside a molding machine. To riddle a layer of sand onto the pattern, the machine operator need only swing the riddle into position over



the pattern. A limit switch starts the riddling action and ends it automatically when the operator swings the riddle away from the pattern. Operation of the riddle unit itself is automatic. A number of riddling screens are available to meet any requirements. *Beardsley & Piper, Div. Pettibone Mulliken Corp.*

For more data circle No. 50 on postcard, p. 183.

Breakage-free tapping

Special releasing driver, capable of reducing tap breakage drastically, has been designed with a spring-loaded shank to accommodate lead screw tapping. The adjustable-torque clutch mechanism operates on a safe-torque principle, a



method that assures complete release and eliminates objectionable friction, heat, wear, and impact action. The driver may be preset to release when machining torque approaches the strength limits of the tap under required operating conditions. *Scully-Jones & Co.*

For more data circle No. 51 on postcard, p. 183.

Unusual in Many Respects



with...

10 TON
MAGNET
HOIST

5 TON
SCRAP
GRAPPLE
HOIST

The bridge is 85 feet wide. Full magnetic control is incorporated.

Present day progress cannot produce a more efficient, more serviceable crane.

We'll be glad to send details regarding this unusual crane or consult with you about one designed to meet your particular needs.

Euclid Cranes



The EUCLID CRANE & HOIST CO.

1361 CHARDON ROAD
EUCLID, OHIO

PUNCHES

DIES • RIVET SETS
COMPRESSION
RIVETER DIES

Made of highest standards and uniform quality thus insuring maximum service. Since 1903

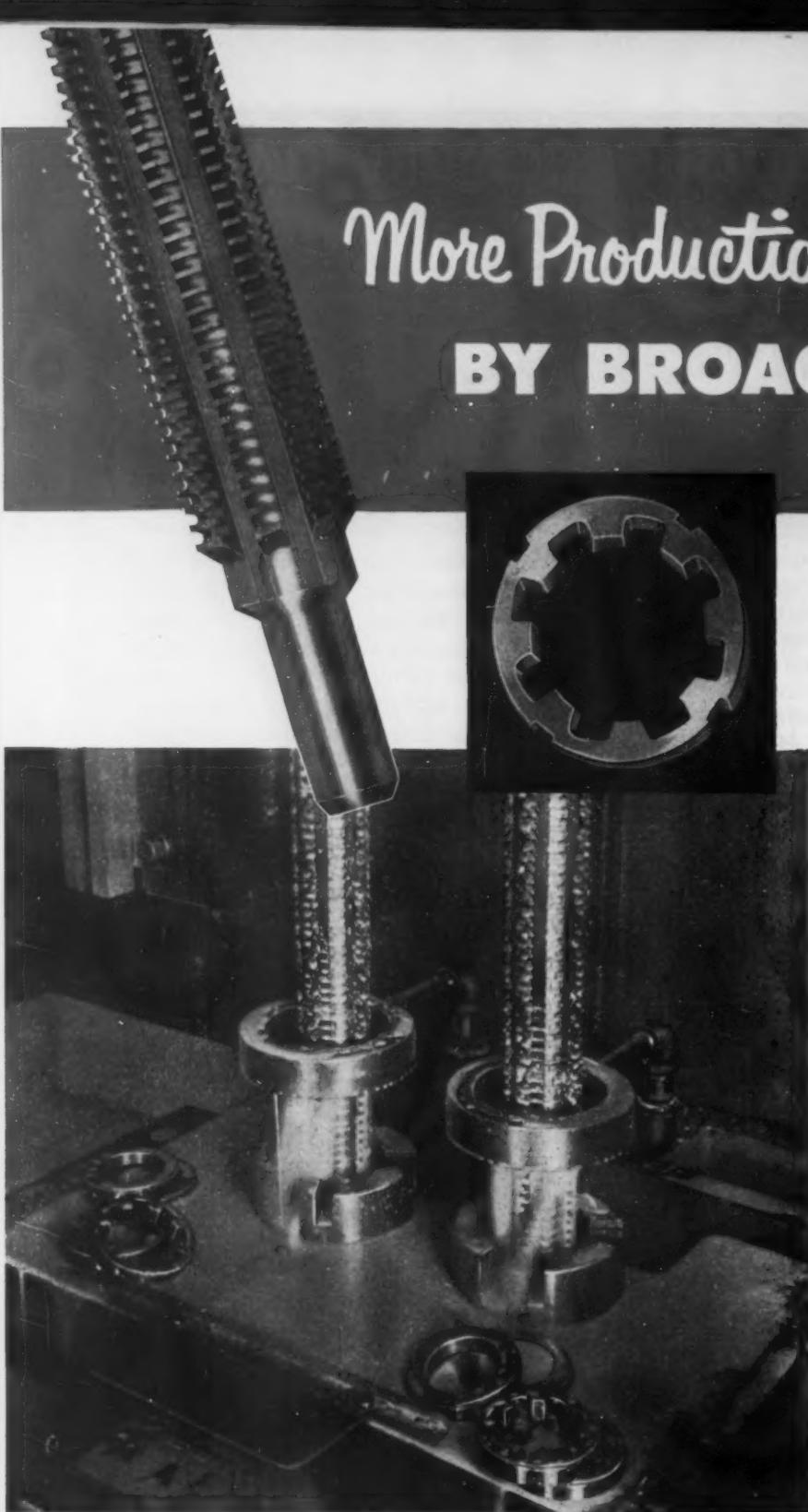
Large inventory of stock sizes of round punches and dies, also rivet sets available for immediate shipment. Square, rectangular, oblong and elliptical shapes made to order.

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Catalog 54

GEO. E. MARCHANT COMPANY

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More Production, More Profit

BY BROACHING . . .

**REMOVE STOCK TO
PRECISION LIMITS
FAST . . . ROUGH
AND FINISH
IN ONE PASS!**

The scope of Broaching has broadened in recent years. Many broaching operations do precision work in far less time than other metal-cutting methods.

Continental Engineers have for years been designing all types of cutting tools, broaches and broaching fixtures. They can recommend the most economical way to do your work.

For facts about increasing your production by broaching, call in your local Ex-Cell-O representative—or write Continental in Detroit for Cutting Tool Catalog.

Internal broaching of a cam ring. The spline form has unsymmetrical sides and cam form on the major diameter. The steel is soft and tends to tear, yet this Continental Broach sizes the I.D. and cuts 8 splines $5/16"$ deep in one pass.

Continental

TOOL WORKS

DIVISION OF EX-CELL-O CORPORATION
DETROIT 32, MICHIGAN



The Iron Age SUMMARY . . .

Detroit mill lops premium prices off several types of bars . . . Others will meet competition . . . Ingot rate gains 3.5 points.

Prices . . . A Detroit producer has lowered base prices from \$2 to \$3 a ton on several types of bars and alloy blooms, billets and slabs. Specifically, cold-finished carbon bars were reduced \$3 a ton, and hot-rolled alloy bars, cold-drawn alloy bars, and alloy blooms, billets and slabs were all reduced \$2 a ton.

Consumers in the Detroit area will start benefiting immediately since other producers in the area are expected to make retroactive adjustments in their prices after thorough study of the action. Producers from other areas will in most cases meet the new Detroit prices by absorbing freight charges.

Although consumers will pay less for these products, and mill net returns will be lower, these are not considered price cuts. Prior to reductions, these items had commanded a premium in Detroit. The new base prices are the same as f.o.b. mill prices of major producers in other areas.

It is certainly true that this last frontier of premium prices is feeling very strong pressure from a highly competitive market. The trend appears to be toward shaving or elimination of historic price premiums in the Detroit market.

Production . . . Steelmaking operations this week are scheduled at 66.5 pct of rated capacity, up 3.5 points from last week's revised rate. Steel-
ingot production index is estimated at 98.4
(1947-49 = 100).

This week's operating rate is the highest for any week since June. And the 3.5 points gain in the operating rate is the second sharpest recovery so far this year. It was exceeded only by the 4.5 points recovery the week of July 11 when operations were bouncing back from the Fourth of July holiday.

New Orders . . . Gradual improvement in the rate of new orders continues. Demand is noticeably stronger in the Chicago area than it is in Pittsburgh or the East. Although a few automotive orders are trickling in, the auto industry is still holding back the bulk of its steel buying for new models. Some of the independents remain completely out of the market.

Outlook . . . It is expected that production will continue to edge up slowly. Order backlogs are small, and the production rate is very sensitive to the rate of placing new orders. An operating rate in the Seventies may be expected by November, if not sooner.

Steel Output, Operating Rates

Production (Net tons, 000 omitted)	This Week†	Last Week	Month Ago	Year Ago
Ingot Index (1947-49=100)	98.4	93.5	91.8	128.2
Operating Rates				
Chicago	69.0	67.5	66.0	100.5
Pittsburgh	66.0	66.0*	61.0	95.0
Philadelphia	56.0	56.0	56.0	97.0
Valley	57.0	58.0	58.0	96.0
West	79.5	73.0*	76.0	102.0
Detroit	77.0	74.0	68.0	100.0
Buffalo	56.5	56.5	56.5	31.0
Cleveland	72.5	59.5	55.0	95.0
Birmingham	75.0	68.0	58.0	96.5
S. Ohio River	76.0	79.0	72.0	82.0
Wheeling	97.0	71.0*	83.0	100.0
St. Louis	66.5	56.0	51.5	95.0
East	53.0	47.0*	48.0	80.0
Aggregate	64.5	52.0*	42.0	80.0

Aggregates

Prices At A Glance

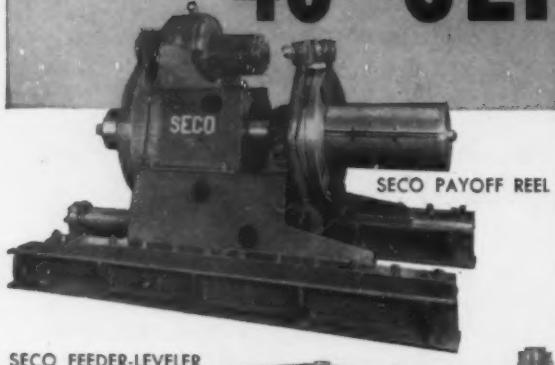
(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite prices				
Finished Steel, base	4.801	4.801	4.801	4.634
Pig Iron (gross ton)	\$56.59	\$56.59	\$56.59	\$56.59
Scrap, No. 1 hvy (\$ per ton)	\$20.50	\$20.00	\$20.47	\$21.17

Nonferrous

	Aluminum, ingot	22.20	22.20	22.20	21.50
Copper, electrolytic	30.00	30.00	30.00	29.50	
Lead, St. Louis	14.30	14.30	13.80	13.80	
Magnesium, ingot	27.75	27.75	27.75	27.00	
Nickel, electrolytic	63.08	63.08	63.08	63.08	
Tin, Straits, N. Y.	93.875	93.25	92.625	81.125	
Zinc, E. St. Louis	11.50	11.50	11.00	10.00	

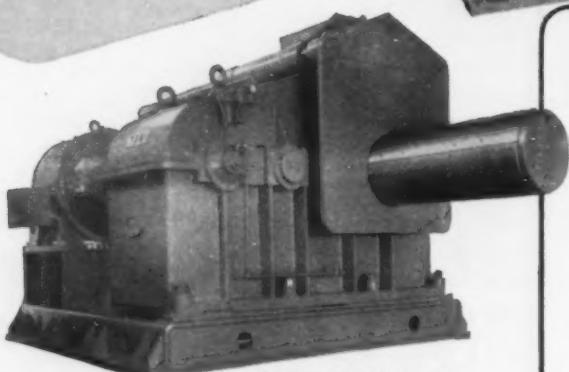
Big, New HEAVY-DUTY SECO 48" SLITTING LINE



SECO FEEDER-LEVELER



**SECO
SLITTING
EQUIPMENT—
the latest in design,
engineering and
efficiency**

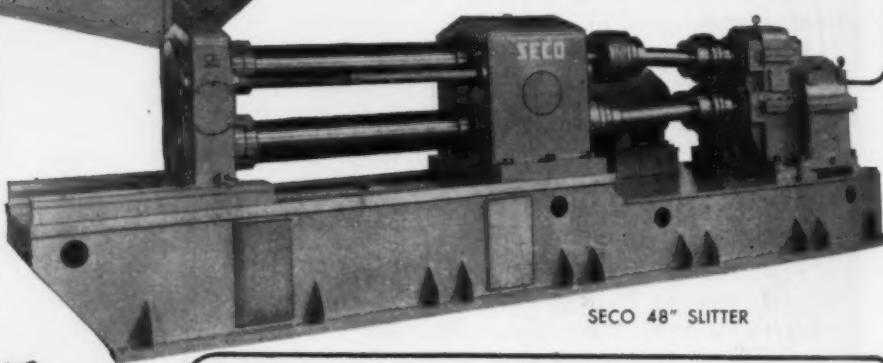


SECO TENSION REEL

Sets New Standards

- in Performance and Production
- in Fast, Profitable Operation
- in Safe Handling of Coils Up to 32,000 Pounds

This rugged new SECO Slitting Line handles steel $\frac{1}{4}$ " thick in coils 48" wide, weighing up to 32,000 pounds. The efficient, streamlined SECO Slitter, shown below, makes seven cuts in .250" stainless or low carbon steel at slitting speeds of 100 to 400 feet per minute. This slitter has overrunning clutches for pull-thru slitting. Arbors are 9 $\frac{1}{2}$ " diameter with 16" knives.



SECO 48" SLITTER

Exceptional quality and accuracy are built into each piece of SECO equipment—assuring efficient, trouble-free, high production.

The Payoff Reel (top left) is of the positioning type, with power feed-up. The Feeder-Leveler is, like other SECO equipment, of the most modern design. The Tension Reel (left) has a 54" long automatic block, 22" in diameter, hydraulic stripper, 250 H.P. motor.

Call or write SECO on your requirements for slitters or other cold-rolled strip mill equipment. We're glad to furnish full information—no obligation. Our years of engineering experience and complete plant facilities are at your service.

SECO

STEEL EQUIPMENT CO.

20805 AURORA ROAD • CLEVELAND 22, OHIO

♦ AN UPTURN in the steel market is still more in the nature of a "feeling" or "tone" than in concrete orders on the books. Here and there are indications that automotive and appliance makers have stepped up orders slightly but the picture is spotty.

Steel salesmen are beating the bushes harder than ever this week in the hope of putting the finger on that elusive upswing that is confidently expected to materialize in fourth quarter.

Meanwhile, here are some recent market developments:

Rotary Electric Steel Co., Detroit, eliminated its premium on alloy blooms, billets, and slabs; alloy hot-rolled bars, alloy cold-finished bars, and cold-finished carbon bars. The new prices are on a level with those of Pittsburgh producers: \$86 a ton on alloy semi-finished; 5.075¢ per lb on alloy hot-rolled bars, 6.625¢ on alloy cold-finished bars, and 5.40¢ on cold-finished carbon bars. One source estimates the changes affect 750,000 tons of product and will save automobile producers \$3 to \$3.50 per ton.

Armeo Steel Corp. is offering slit cold-rolled carbon sheets, commercial quality only, from the mill, in widths 12-in. to 2-in. in gauges 14 through 28. Other sheet producers are expected to follow suit. The move represents an effort by the mills to regain business formerly done by warehouses and job slitters. It also will provide the consumer with a continuing source of such material from the mills. The move will not affect the strip market.

SHEETS AND STRIP . . . Chicago is a relative strong point for cold-rolled sheets; while deliveries are now on 4-5 week basis one mill expects this to extend to 7 weeks this month; sheet demand expected to gain strength over balance of year; hot-rolled, most sheet continues slow. Cleveland also shows signs of perking up. Detroit continues slow, with only a slight upturn expected for October; Chrysler likely to be first automaker to spur the market; GM and Ford buying steadily but in reduced volume as they cut inventory cycle from 4 weeks to 3 weeks in advance of new model changeover; at least one independent will be out of market remainder of year. Pittsburgh continues

STEEL PRODUCT MARKETS

Some Products Look Bullish

Steelmen are talking up the predicted fourth quarter market upswing . . . As yet there's little or no increase showing up on the order books . . . Oil country eases.

slow although one producer notes mild upturn in demand from automotive and appliance customers. Tin-plate market only fair although near-term prospects regarded as good. Galvanized demand continues strong; Chicago is solid through November on continuous.

BARS . . . Alloy bars producers have been living through a trying period. A Pittsburgh area producer reports that August shipments were the lowest since 1949 and September not likely to show any improvement; third quarter is being written off as one of poorest in years. Rotary Electric price action will force alloy and cold-finished bars producers in other areas to absorb more freight in order to compete on those products Rotary makes. Chicago bar market continues slow with mild pickup from farm equipment and appliance. Construction activity in East is sustaining reinforcing bars but prices continue soft; alloy bars, slow; inventories reported down. Detroit shows no sign of coming alive. West Coast demand unchanged.

STRUCTURALS AND PLATE . . . Pittsburgh considers structurals market good; producers under pressure for prompt delivery, indicating inventories are low; wide-flange beams still in stronger demand; railroad market looks a bit better; plates

showing better tone; fabricators of pressure vessels providing steady, though not strong demand, and pipe market looking better potentially. Structural competition in East resembles a rat-race, with small fabricators and even a shipyard underbidding the big companies; highway and turnpike business a saving feature; plates show no measurable improvement. Structural demand is up slightly on West Coast; plate market looks hopeful on basis pending pipeline jobs; one mill booked through October, others through September. Chicago structural market considered satisfactory but backlog virtually nonexistent; fabricators still buying despite earlier reports of pending slowdown; plates slow until proposed pipeline contracts are let.

PIPE AND TUBING . . . Oil country goods market growing more competitive due to increased capacity and foreign competition; oil companies also adopt short-term buying policy. Mills expected to operate at near-capacity through fourth quarter although backlog dropping sharply. No freight absorption as yet. Merchant pipe, supported by construction activity, holding firm but competitive on delivery.

WIRE . . . Pittsburgh notes a slight uptrend; outlook for manufacturers wire in fourth quarter considered good; merchant wire demand expected to improve with approach of fall buying season; construction products considered fair into November. Chicago market still good; merchant products show signs of perking up; manufacturers and packaging wire registering increased strength. Business brisk in East, with one producer reporting August slightly better than July; most consumers buying on hand-to-mouth basis, suggesting low inventories; fall pickup not yet materialized but one source looks for 20 pct increase in bookings in September.

Purchasing Agent's Checklist

CAPITAL GOODS: See a rosy future . . . p. 107

CHEMICALS: New three-way neoprene, soda plants . . . p. 109

SCRAP: Start trading on Chicago market . . . p. 113

COPPER: Tight market is in the making . . . p. 119

NONFERROUS MARKETS

Zinc Stocks Off Again

Smelter stocks of slab zinc dip 4700 tons . . . Lowest since January . . . New price hike likely . . . Copper market tight as result of labor situation—By R. L. Hatschek.

♦ NONFERROUS metal markets range from steady to strong this week with the labor situation in copper and brass getting all the highlights. Strikes both here and in Chile are cutting into supply at a time when buying is on the increase.

For story on current labor and market picture in copper, turn to p. 119.

While their ills are certainly not yet cured, zinc producers are whistling more cheerily right now as government business has been placed at both the new 11.50¢ East St. Louis price and the October average. This probably presages another increase and consumers are beginning to buy more heavily in anticipation of a boost. And smelter stocks, while still too high, are at the lowest point since mid-January and are still trending downward.

ALUMINUM . . . Statistics bear out the fact that vacations made July a dull month in aluminum. Aluminum Assn. shipment figures show that July tonnage was lower in practically all categories. A few items, notably wire as Aluminum Cable Steel Reinforced, made slight gains over June, though these were hardly startling.

But really noteworthy item was foil. July foil shipments established a new record, totaling 6132 tons—breaking the old monthly record for the fifth time in the 7 months tabulated so far in 1954.

Following are July aluminum mill product shipments compared with June totals. Figures are in net tons:

	July	June
Sheet & Plate, total...	42,771	44,535
Non-Heat-Treatable...	33,122	34,491
Heat-Treatable	9,654	10,043
Foil	6,132	5,981*
Extruded products, total	12,133	12,347
Soft Alloys	9,296	9,566
Hard Alloys	2,837	2,781
Tuber, Drawn, total ...	1,797	2,647
Soft Alloys	1,034	2,225
Hard Alloys	263	422
Rod & Bar, Rolled	5,317	5,931
ACSR & Cable, Bare..	5,106	5,073
Wire, Other than Con- ductor	1,504	1,490
Forgings	1,665	1,718
Castings, total	9,098	10,899
Sand	674	800
Permanent Mold	4,587	5,222
Die	3,838	4,877

*Revised

Aluminum produced in the current quarter by new facilities built under the defense expansion program will total 150,700 tons, estimates General Services Administration. The agency says non-integrated users are getting a minimum of 31,650 tons of the total. In the second quarter, producers made 40,000 tons available to fabricators.

According to GSA, no fabricators have complained in the past 9 months that they were unable to buy metal.

COPPER . . . The labor picture in copper and brass showed only little change over the week end. One new factor in the picture is the start of new wage talks by the United Auto Workers at some New England brass mills. This union is not on strike. It's International Mine, Mill & Smelter Workers Union that's out at three American Brass Co. plants.

Phelps-Dodge Corp. workers re-

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	Sept. 8	Sept. 9	Sept. 10	Sept. 11	Sept. 13	Sept. 14
Copper, electro, Conn.	30.00	30.00	30.00	30.00	30.00	30.00
Copper, Lake, delivered	30.00	30.00	30.00	30.00	30.00	30.00
Tin, Straits, New York	93.25	93.50	93.50	....	93.875	93.875*
Zinc, East St. Louis	11.50	11.50	11.50	11.50	11.50	11.50
Lead, St. Louis	14.30	14.30	14.30	14.30	14.30	14.30

Note: Quotations are going prices

turned to their jobs at the El Paso refinery on Monday—but the end of this strike seemed merely a signal for the start of another. On the same day the United Steelworkers closed down the big Garfield, Utah, smelter of American Smelting & Refining Co.

Kennecott Copper Corp.'s Garfield refinery, represented by the same union, was not struck. But since A. G. & R. smelts Kennecott mine output, the refinery will definitely feel the effects.

Meanwhile, the copper strikes are having a definite tightening effect on the market. Custom smelters report they just can't fill the orders that consumers are trying to place. Scrap prices are also edging upward at both dealer and consumer levels.

ZINC . . . All August figures except smelter stocks were higher in the latest American Zinc Institute report than they were in the preceding monthly tabulation. Production rose 1000 tons to 71,793 tons; increases were recorded in all shipment categories, pushing the total up 2700 tons to 76,535 tons; and unfilled orders climbed 2100 tons to 41,059 tons. Smelter stocks of slab zinc declined 4742 tons during the month and totaled 193,285 tons at the beginning of September.

Breakdown of the shipment figures show that domestic consumers took 61,298 tons, about 2100 more than during July, export and drawback edged up 50 tons to 1525 tons and the government got 500 tons more with 13,712 tons.

Brightest spot in the zinc market, however, is not the improving statistical picture but the sales and price outlook. The government is reported to have purchased an additional tonnage last week at the newly established 11.50¢ quotation and at the October average price. This action by General Services Administration establishes the current price as a floor and willingness to buy on the average price basis sets up the market for a further boost.

Realizing this, consumers are quite likely to step up their buying to boost stocks before a new price boost materializes—and they may have to act quickly to do so.

LEAD . . . Following last week's price boost, which occurred when the London price reached a level about 0.25¢ per lb higher than its New York equivalent, the U. S. market spurted. This spurt in demand, however, was only temporary and the market has since quieted down to a moderate pace. The current 14.30¢ price for lead at St. Louis remains firm.



COPPER DETERMINATION

Alloymet 2030

(65% Nickel 30% Copper 5% Iron)*

A product of close Metallurgical **CONTROL**
for the production of low alloy steel and gray iron

Pre-alloyed master alloys are leaving an indelible mark on the iron and steel industry. The element of human error is reduced many fold, since a single alloying agent, ALLOYMET 2030 ingot or shot, can replace many separate inoculants. A single trial of Alloymet 2030 or its companion alloys will make you an "Alloymet regular."

For further information, write us for our booklet, "Master Alloys." 



*Nominal Chemical Composition

ALTER

Alloy Metal Division

C O M P A N Y

1701 Rockingham Road, DAVENPORT, IOWA.

Phone 6-2561 Teletype DV 588

Nonferrous Prices

(Effective Sept. 14, 1954)

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb. f.o.b. ship. pt., frt. allowed)

Flat Sheet: 0.136-0.249 in., 2S, 3S, 34.9¢; 4S, 37.1¢; 52S, 39.2¢; 24S-O, 24S-OAL, 38.3¢; 75-S-O, 75S-O, 45.8¢; 0.081 in., 2S, 3S, 36.1¢; 4S, 38.8¢; 52S, 40.9¢; 24S-O, 24S-OAL, 39.8¢; 75S-O, 75S-OAL, 48.1¢; 0.052 in., 2S, 3S, 38.1¢; 4S, 45.0¢; 52S, 45.7¢; 24S-O, 24S-OAL, 48.4¢; 75S-O, 75S-OAL, 59.8¢.

Plate: $\frac{1}{4}$ -in. and heavier: 2S-F, 3S-F, 33.6¢; 4S-F, 35.7¢; 52S-F, 37.4¢; 61S-O, 36.8¢; 24S-O, 24S-OAL, 38.4¢; 75S, 75S-OAL, 45.8¢.

Extruded Solid Shapes: Shape factors 1 to 5, 37.7¢ to 85.7¢; 12 to 14, 38.4¢ to \$1.03; 24 to 26, 41.2¢ to \$1.34; 36 to 38, 48.8¢ to \$1.96.

Rod, Round: Rolled, 1.064-4.5 in., 2S-F, 42.6¢ to 50.1¢; cold finished, 0.375-3.499 in., 2S-F, 46.9¢ to 41.4¢.

Screw Machine Stock: Rounds, 11S-T3, 14-11/32 in., 62.5¢ to 49.1¢; $\frac{1}{4}$ -1 $\frac{1}{2}$ in., 48.9¢ to 45.9¢; 1 9/16-3 in., 44.7¢ to 41.7¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051-0.274 in., 28, 46.1¢ to 34.8¢; 52S, 55.7¢ to 43.4¢; 17S-T4, 63.8¢ to 43.7¢; 61S-T4, 58.5¢ to 43.4¢.

Extruded Tubing: Rounds, 68S-T5, OD 1 $\frac{1}{4}$ -2 in., 43.4¢ to 63.8¢; 2 $\frac{1}{2}$ in., 39.3¢ to 58.6¢; 4-6 in., 39.8¢ to 48.8¢; 6-9 in., 40.4¢ to 51.1¢.

Roofing Sheet: Flat, per sheet, 0.032-in. 42.3¢ x 60-in., \$2.918; x 96-in., \$4.672; x 120-in., \$5.841; x 144-in., \$7.009. Coiled sheet, per lb, 0.019 in. x 28 in., 29.9¢.

Magnesium

(F.o.b. mill, freight allowed)

Sheet & Plate: FS1-O $\frac{1}{4}$ in., 56¢; 3/16 in., 57¢; $\frac{1}{8}$ in., 60¢; 0.064 in., 73¢; 0.032 in., 94¢. Specification grade higher. Base 30,000 lb.

Extruded Round Rod: M, diam $\frac{1}{4}$ to 0.311 in., 77¢; $\frac{1}{2}$ to $\frac{3}{4}$ in., 60.5¢; 1/4 to 1.749 in., 56¢; 2 $\frac{1}{2}$ to 5 in., 51.6¢. Other alloys higher. Base up to $\frac{1}{4}$ in. diam, 10,000 lb; $\frac{1}{2}$ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes: Rectangles: M. In weight per ft, for perimeters less than size indicated: 0.10 to 0.11 lb, 3.5 in., 65.8¢; 0.22 to 0.25 lb, 5.9 in., 62.8¢; 0.50 to 0.59 lb, 8.6 in., 59.7¢; 1.8 to 2.59 lb, 19.5 in., 56.8¢; 4 to 6 lb, 28 in., 52¢. Other alloys higher. Base, in weight per ft of shape: Up to $\frac{1}{2}$ lb, 10,000 lb; $\frac{1}{2}$ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, 0.049 to 0.057 in. wall thickness: OD $\frac{1}{4}$ to 5/16 in., \$1.48; 5/16 to $\frac{3}{8}$ in., \$1.29; $\frac{1}{2}$ to $\frac{5}{8}$ in., 96¢; 1 to 2 in., 79¢; 0.165 to 0.219 in. wall; OD, $\frac{1}{2}$ to $\frac{3}{4}$ in., 64¢; 1 to 2 in., 60¢; 3 to 4 in., 59¢. Other alloys higher. Base, OD: Up to 1 $\frac{1}{4}$ in., 10,000 lb; 1 $\frac{1}{4}$ to 3 in., 20,000 lb; over 3 in., 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheets and strip, HR or CR, \$15; Plate, HR, \$12; Wire, rolled and/or drawn, \$11; Bar, HR or forged, \$6; Forgings, \$6.

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	86.1¢	67.1¢	92.1¢
Strip, CR	92.1¢	70.1¢	98.1¢
Rod, bar	82.1¢	65.1¢	88.1¢
Angles, HR	83.1¢	65.1¢	88.1¢
Plate, HR	84.1¢	66.1¢	90.1¢
Seamless tube	115.1¢	100.1¢	137.1¢
Shot, blocks	...	60	...

Copper, Brass, Bronze

(Freight included on 500 lb.)

	Sheet	Rods	Shapes
Copper	46.41	48.48	
Copper, h-r	48.33	41.73	...
Copper, drawn	45.98		
Low brass	44.47	44.41	...
Yellow brass	41.72	41.66	...
Red brass	45.44	45.38	...
Naval brass	45.76	40.07	
Leaded brass		39.11	
Com. bronze	46.95	46.89	
Mang. bronze	49.48	43.62	45.18
Phos. bronze	66.58	67.08	
Muntz metal	43.96	39.77	41.02
NI silver, 10 pct	55.36		62.63
Beryllium copper, CR, 1.9% Be, Base			
2000 lb, f.o.b.			
Strip			\$1.68
Rod, bar, wire			1.65

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed

Aluminum pig

Antimony, American, Laredo, Tex.

Beryllium copper, per lb cont'd be. \$40.00

Beryllium aluminum 5% Be, Dollars

per lb contained Be

Bismuth, ton lots

Cadmium, del'd

Cobalt, 97-99% (per lb)

Copper, electro, Conn. Valley

Copper, Lake, delivered

Gold, U. S. Treas., per troy oz.

Indium, 99.8%, dollars per troy oz.

Iridium, dollars per troy oz.

Lead, St. Louis

Lead, New York

Magnesium, 99.8+%, f.o.b. Freeport,

Tex., 10,000 lb, pig

Magnesium, sticks, 100 to 500 lb,

46.00 to 48.00

Mercury, dollars per 76-lb flask,

f.o.b. New York

Nickel electro, f.o.b. N. Y. warehouse

Nickel oxide sinter, at Copper Creek, Ont., contained nickel

Palladium, dollars per troy oz.

Platinum, dollars per troy oz.

Silver, New York, cents per troy oz.

Tin, New York

Titanium, sponge, grade A-1

Zinc, East St. Louis

Zinc, New York

Zirconium copper, 50 pct.

REMETLED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot

No. 115

No. 120

No. 123

80-10-10 ingot

No. 305

No. 315

88-10-2 ingot

No. 210

No. 215

No. 245

Yellow ingot

No. 405

Manganese bronze

No. 421

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys

0.30 copper, max.

0.60 copper, max.

Piston alloys (No. 122 type)

No. 12 alum. (No. 2 grade)

108 alloy

195 alloy

13 alloy (0.60 copper max.)

ASX-679

20.75-21.00

20.75-23.75

23.25-23.50

20.50-21.75

19.75-20.25

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"Mirror, mirror on my car...
you're the handsomest, by far!"



It takes foresight (and hindsight, too) to make a life-bright rear-sight mirror. Experience (sometimes sad) shows there's nothing like Brass . . . good, solid Bristol Brass . . . for the frame and backing. No other non-corrosive metal is so easy to work. And no other metal takes such a smooth, impervious finish . . . a finish which, in turn, takes a plate that remains brilliant for the life of the car.

Yes, the solid base of several quality car-mirrors is *Bristol Brass* which gives the manufacturer uniform working qualities . . . and gives the user uniform lasting qualities. And you . . . whether you make mirrors or magnetos, or any other product that can profit by using Brass . . . make sure you get *Brass at Its Best* . . . which means Brass strip, rod, and wire from the modern mills here in Bristol.

THE BRISTOL BRASS
CORPORATION

has been making Brass strip, rod and wire here in Bristol, Connecticut since 1850, and has offices and warehouses in Albany, Boston, Buffalo, Chicago, Cleveland, Detroit, Milwaukee, New York, Philadelphia, Providence, Rochester, Syracuse. The Bristol Brass Corporation of California, 1217 East 6th St., Los Angeles 21. The Bristol Brass Corporation of Ohio, 1607 Broadway, Dayton.

"Bristol-Fashion" means **Brass at its Best**

Mill Buying Boosts Prices

Market continues to strengthen as consumers up purchasing . . . Turnings demand, prices rise . . . Increased foundry activity boosts cast . . . Composite at \$29.50.

◆ SCRAP PRICES continued to register gains as consumers stepped up purchases. Advances were usually not dramatic, but the market was solid overall. In many cases other grades moved up to reflect previous increases in No. 1 steel and bundles. THE IRON AGE Steel Scrap Composite Price rose to \$29.50 per gross ton, highest point this year since the first week in January, when it stood at \$29.67.

Almost all areas reported mounting demand and higher prices for railroad grades, while blast furnace material, generally dull throughout the summer, took a new lease on life. Pickup in foundry business stirred activity in cast scrap in almost all districts.

In the three major steelmaking districts of Chicago, Pittsburgh, and Philadelphia, only Philadelphia showed an increase in heavy melting and bundles. But prices in Pittsburgh and Chicago had risen earlier, and the East Coast rise had been predicted for some time when domestic mills entered a market heavily committed to export orders.

And in Chicago and Pittsburgh, as in other producing areas, brokers and dealers were carefully watching the steel ingot rate for a clue to future mill buying.

Pittsburgh . . . The market quieted down this week. Prices of steelmaking grades were firm but unchanged. Short turnings were up 50¢ on basis of a purchase. Cupola cast advanced \$2 per ton. Brokers and dealers were watching the ingot rate closely in an effort to determine which way the market is likely to go. Indications of improved steel order books have injected a note of optimism into sentiment here.

Chicago . . . Though No. 1 RR heavy melting stayed steadfast, other railload grades began moving up again

this week as did several of the cast grades. Market forecasters are split down the middle with one school contending that steelmaking factory grades could move up within the next couple of weeks. A few of the purchasing agents counter by pointing out that they have been offered unusually large tonnages within the past 5 days, suggesting that there are at least a few sellers who feel they have waited long enough for market action at present prices.

Philadelphia . . . Local buying in competition with export prices has boosted delivered mill quotations on steelmaking grades. And new buying in other categories has brought other prices up with the exception of cast items which remain steady. The export buying is continuing and some members of the trade feel it may continue for the rest of the year.

New York . . . Buying by a mill in an adjacent consuming district further braced a market already well bolstered by export business. Higher prices confirmed trade predictions that domestic buyers would have to pay more for steelmaking grades when they came into the market. Turnings, dull throughout the summer, also responded to new buying with higher prices.

Detroit . . . This market continues to be firm with all prices steady or higher this week on the basis of extended buying. Mill inventories are at a high level, but the small amount of scrap being generated or held in dealer yards gives the price structure its support. Turnings continued to climb on the basis of local purchases and shipments to the dock for Lake movement.

Cleveland . . . With three additional openhearts going into service this week dealers were feeling bullish although no major sales materialized. Mills still have bulging scrap inventories and are in no hurry to buy.

Dealers claim if mills attempted large purchase, they could not cover so price would go up. Major reason is dwindling of industrial scrap from automakers due to reduced operations.

Birmingham . . . Higher steel production rates are increasing demands for scrap in the South and mills are finding they must compete with the export trade, which has been very active in recent weeks. Result is that in the last 2 weeks mills have posted increases on nearly all grades.

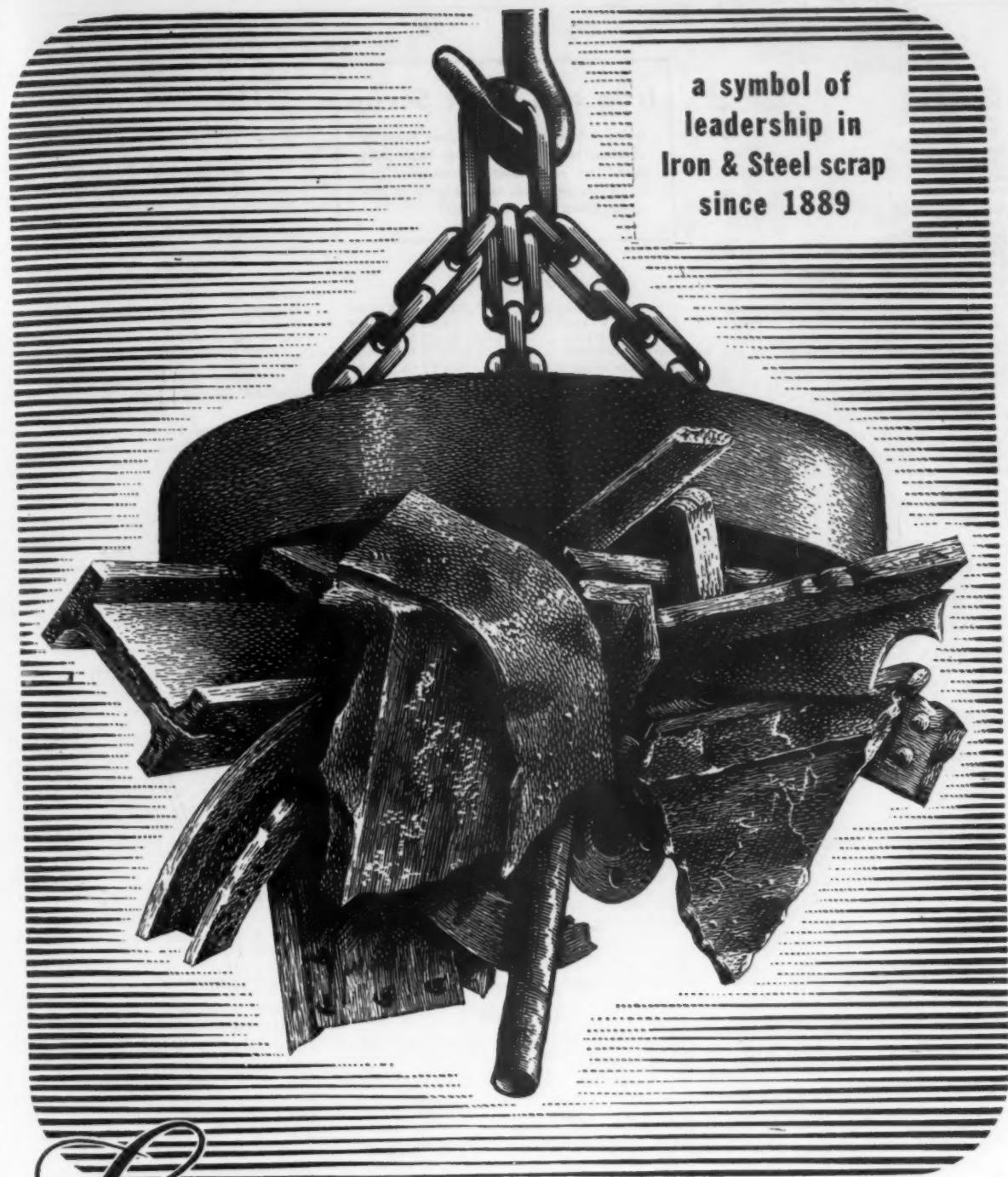
St. Louis . . . Anticipating increased needs of steel mills in this district for the last quarter of the year, brokers have raised their buying prices \$1 per ton on a number of items. It was felt that higher prices are necessary to develop tonnages from territories outside the regular assembling area. Steel operations are up to 66.5 pct, the best in several weeks.

Cincinnati . . . Market continues quiet with routine purchases at prevailing prices by one area steel producer. Low phos, random length rails and 18 in. and under rails went up \$1 on basis of industrial bidding last week. Although sales were not heavy tonnage, they represented only major activity in area.

Buffalo . . . Price advances of 50¢ to \$1 per ton were posted in the scrap market here. One of the top mills placed orders for approximately 10,000 tons of steel items. Small buying also was reported from other sources. Interest in blast furnace grades was shown at an advance of \$1. Canadian buying is absorbing cast supplies at current prices.

Boston . . . The New England scrap market this week joined other areas in a somewhat firmer tone. All steelmaking grades and several other items are quoted higher this week. The strength results largely from continued export business but domestic signs seem brighter with one Pittsburgh mill buying in the area and a beginning of some small demand for turnings and unstripped motor blocks.

West Coast . . . Seattle expects increased demand in next few weeks as one mill fires a third of its five furnaces (only two in use last several weeks); three will stay in operation at least through September. No change in prices, demand, or supply. Small San Francisco mill still on strike, joined by small Los Angeles mill. Cast prices dropped off in Los Angeles as anticipated. Demand in San Francisco still holding strong.



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CLEVELAND, OHIO	NEW YORK, N. Y.	SAN FRANCISCO, CAL.
		SEATTLE, WASH.

Scrap Prices

(Effective Sept. 14, 1954)

Pittsburgh

No. 1 hvy. melting	\$30.00 to \$31.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 bundles	30.00 to 31.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	16.00 to 17.00
Mixed bor. and ms. turns.	16.00 to 17.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	19.00 to 20.00
Low phos. punch'gs, plate	33.00 to 34.00
Heavy turnings	27.00 to 28.00
No. 1 RR. hvy. melting	32.00 to 33.00
Scrap rails, random lgth.	37.00 to 38.00
Rails 2 ft and under	43.00 to 44.00
RR. steel wheels	35.00 to 36.00
RR. spring steel	35.00 to 36.00
RR couplers and knuckles	35.00 to 36.00
No. 1 machinery cast	42.00 to 43.00
Cupola cast	35.00 to 36.00
Heavy breakable cast	30.00 to 31.00

Chicago

No. 1 avy. melting	\$29.00 to \$30.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 factory bundles	31.00 to 32.00
No. 1 dealers' bundles	29.00 to 30.00
No. 2 dealers' bundles	21.00 to 22.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Low phos. forge crops	34.00 to 35.00
Low phos. punch'gs, plate	32.00 to 33.00
Low phos. 3 ft and under	32.00 to 33.00
No. 1 RR. hvy. melting	32.00 to 33.00
Scrap rails, random lgth.	37.00 to 39.00
Rerolling rails	45.00 to 46.00
Rails 2 ft and under	45.00 to 46.00
Locomotive tires, cut	33.00 to 34.00
Cut bolsters & side frames	35.00 to 36.00
Angles and splice bars	37.00 to 38.00
RR. steel car axles	40.00 to 41.00
RR. couplers and knuckles	35.00 to 36.00
No. 1 machinery cast	40.00 to 41.00
Cupola cast	37.00 to 38.00
Heavy breakable cast	30.00 to 31.00
Cast iron brake shoes	32.00 to 33.00
Cast iron car wheels	33.00 to 34.00
Malleable	40.00 to 41.00
Stove plate	29.00 to 30.00

Philadelphia Area

No. 1 hvy. melting	\$28.00 to \$29.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 bundles	28.00 to 29.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	15.50 to 16.00
Mixed bor. short turn.	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Shoveling turnings	19.00 to 20.00
Clean cast chem. borings	21.00 to 22.00
Low phos. 5 ft and under	29.00 to 30.00
Low phos. 2 ft and under	30.00 to 31.00
Low phos. punch'gs	30.00 to 31.00
Elec. furnace bundles	28.00 to 29.00
Heavy turnings	26.00 to 27.00
RR. steel wheels	32.00 to 33.00
RR. spring steel	32.00 to 33.00
Rails 18 in. and under	42.00 to 43.00
Cupola cast	34.00 to 35.00
Heavy breakable cast	35.00 to 36.00
Cast iron carwheels	38.00 to 39.00
Malleable	36.00 to 37.00
Unstripped motor blocks	27.00 to 28.00
No. 1 machinery cast	40.00 to 41.00
Charging box cast	36.00 to 37.00

Cleveland

No. 1 hvy. melting	\$28.00 to \$29.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 bundles	28.00 to 29.00
No. 2 bundles	23.00 to 24.00
No. 1 busheling	28.00 to 29.00
Machine shop turn.	12.00 to 13.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Cut struct'r'l & plate, 2 ft & under	33.00 to 34.00
Drop forge flashings	28.00 to 29.00
Low phos. 2 ft & under	30.00 to 31.00
No. 1 RR. heavy melting	29.00 to 30.00
Rails 3 ft and under	44.00 to 45.00
Rails 18 in. and under	45.00 to 46.00
Railroad grate bars	27.00 to 28.00
Steel axle turnings	19.00 to 20.00
Railroad cast	43.00 to 44.00
No. 1 machinery cast	43.00 to 44.00
Stove plate	34.00 to 35.00
Malleable	42.00 to 43.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Youngstown

No. 1 hvy. melting	\$31.00 to \$32.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 bundles	31.00 to 32.00
No. 2 bundles	23.00 to 24.00
Machine shop turn.	14.00 to 15.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	19.00 to 20.00
Low phos. plate	32.00 to 33.00

Buffalo

No. 1 hvy. melting	\$27.00 to \$28.00
No. 2 hvy. melting	22.50 to 23.50
No. 1 busheling	27.00 to 28.00
No. 1 bundles	27.00 to 28.00
No. 2 bundles	20.50 to 21.50
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	18.00 to 19.00
Shoveling turnings	18.50 to 19.50
Cast iron borings	18.00 to 19.00
Low phos. plate	30.00 to 31.00
Scrap rails, random lgth.	33.00 to 34.00
Rails 2 ft and under	40.00 to 41.00
RR. steel wheels	34.00 to 35.00
RR. spring steel	34.00 to 35.00
RR. couplers and knuckles	34.00 to 35.00
No. 1 machinery cast	38.00 to 39.00
No. 1 cupola cast	34.00 to 35.00

Detroit

No. 1 hvy. melting	\$22.50 to \$23.50
No. 2 hvy. melting	19.00 to 20.00
No. 1 bundles, openhearth	24.00 to 25.00
No. 2 bundles	16.50 to 17.50
New busheling	22.50 to 23.50
Drop forge flashings	22.50 to 23.50
Machine shop turn.	9.00 to 11.00
Mixed bor. and turn.	12.50 to 13.50
Shoveling turnings	12.50 to 13.50
Cast iron borings	12.50 to 13.50
Low phos. punch'gs, plate	23.00 to 24.00
No. 1 cupola cast	32.00
Heavy breakable cast	23.00
Stove plate	28.00
Automotive cast	36.00

St. Louis

No. 1 hvy. melting	\$26.00 to \$27.00
No. 2 hvy. melting	24.50 to 25.50
No. 1 bundles	26.00 to 27.00
No. 2 bundles	19.00 to 20.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	14.50 to 15.50
Shoveling turnings	14.50 to 15.50
Cast iron borings	14.50 to 15.50
Low phos., 18 in. & under	33.00 to 34.00
Rails, random lengths	36.00 to 37.00
Rails, 18 in. and under	44.00 to 45.00
No. 1 cupola cast	38.00 to 39.00
Hvy. breakable cast	34.00 to 35.00
Drop broken cast	43.00 to 44.00

No. 1 hvy. melting	\$21.50 to \$22.50
No. 2 hvy. melting	18.50 to 19.50
No. 2 bundles	15.00 to 16.00
Machine shop turn.	7.00 to 8.00
Mixed bor. and turn.	9.00 to 10.00
Shoveling turnings	11.50 to 12.50
Clean cast chem. borings	16.00 to 17.00
No. 1 RR. hvy. melting	32.50 to 33.50
Rails, random lengths	35.00 to 36.00
Rails, 18 in. and under	42.00 to 43.00
Locomotive tires, uncut	32.00 to 33.00
Angles and splice bars	34.00 to 35.00
Std. steel car axles	35.00 to 36.00
RR. spring steel	32.00 to 33.00
Cupola cast	41.00 to 42.00
Hvy. breakable cast	30.00 to 31.00
Cast iron brake shoes	26.00 to 27.00
Stove plate	35.00 to 36.00
Cast iron car wheels	32.00 to 33.00
Malleable	35.00 to 36.00
Unstripped motor blocks	30.00 to 31.00

New York

No. 1 hvy. melting	\$21.50 to \$22.50
No. 2 hvy. melting	18.50 to 19.50
No. 2 bundles	15.00 to 16.00
Machine shop turn.	7.00 to 8.00
Mixed bor. and turn.	9.00 to 10.00
Shoveling turnings	11.50 to 12.50
Clean cast chem. borings	16.00 to 17.00
No. 1 machinery cast	35.00 to 36.00
Mixed yard cast	29.00 to 30.00
Charging box cast	29.00 to 30.00
Heavy breakable cast	27.00 to 28.00
Unstripped motor blocks	22.00 to 23.00

Birmingham

No. 1 hvy. melting	\$23.50 to \$24.50
No. 2 hvy. melting	22.50
No. 1 bundles	22.50
No. 2 bundles	17.00 to 18.00
No. 1 busheling	22.50
Machine shop turn.	15.00 to 16.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	15.00 to 16.00
Electric furnace bundles	28.00 to 29.00
Bar crops and plate	30.50 to 31.50
Structural and plate, 2 ft.	30.50 to 31.50
No. 1 RR. hvy. melting	28.00 to 29.00
Scrap rails, random lgth.	35.00 to 36.00
Rails, 18 in. and under	39.00 to 40.00
Angles & splice bars	37.00 to 38.00
Rerolling rails	39.50 to 40.00
No. 1 cupola cast	45.00 to 46.00
Stove plate	42.00 to 43.00
Charging box cast	19.00 to 20.00
Cast iron car wheels	33.00 to 34.00
Unstripped motor blocks	35.00 to 36.00
Mashed tin cans	15.00 to 16.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	\$19.00 to \$20.00
No. 2 hvy. melting	14.00 to 15.00
No. 1 bundles	19.00 to 20.00
No. 2 bundles	14.00 to 15.00
No. 1 busheling	19.00 to 20.00
Elec. furnace, 3 ft & under	19.00 to 20.00
Machine shop turn.	4.00 to 5.00
Mixed bor. and short turn.	9.00 to 10.00
Shoveling turnings	10.00 to 11.00
Clean cast chem. borings	11.00 to 12.00
No. 1 machinery cast	29.00 to 30.00
Mixed cupola cast	26.00 to 27.00
Heavy breakable cast	25.00 to 25.50
Stove plate	25.00 to 26.00
Unstripped motor blocks	16.00 to 17.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	\$25.50 to \$26.50
No. 2 hvy. melting	22.50 to 23.50
No. 1 bundles	26.00 to 27.00
No. 2 bundles	19.00 to 20.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	14.50 to 15.50
Shoveling turnings	14.50 to 15.50
Cast iron borings	14.50 to 15.50
Low phos., 18 in. & under	33.00 to 34.00
Rails, random lengths	36.00 to 37.00
Rails, 18 in. and under	44.00 to 45.00
No. 1 cupola cast	38.00 to 39.00
Hvy. breakable cast	34.00 to 35.00
Drop broken cast	43.00 to 44.00

San Francisco

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting

To the memory of Peter the Great



In the year 1770, a great block of solid stone weighing 1500 tons was moved into St. Petersburg as a base for the famous equestrian statue of Peter the Great. Moving of such a huge monolith would have been impossible except for a track with ball bearings, designed under the supervision of a Greek engineer.

Twentieth Century transportation and production could not exist without bearings—bearings of every size, shape and description—another of the thousands of steel requirements. To satisfy the continuous demand for steel in millions of tons, a never-ending supply of scrap must be made available to the mills.

For the purchase or sale of iron or steel scrap...

phone or write "Your Chicago Broker"



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Comparison of Prices

(Effective Sept. 14, 1954)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Sept. 14 1954	Sept. 7 1954	Aug. 17 1954	Sept. 15 1954
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.05¢	4.05¢	4.05¢	3.925¢
Cold-rolled sheets	4.95	4.95	4.95	4.775
Galvanized sheets (10 ga.)	5.45	5.45	5.45	5.275
Hot-rolled strip	4.05	4.05	4.05	3.925
Cold-rolled strip	5.82	5.82	5.82	5.575
Plate	4.287	4.287	4.287	4.10
Plates wrought iron	9.30	9.30	9.30	9.30
Stain'l's C-R strip (No. 302)	41.50	41.50	41.50	41.50

Tin and Terneplate: (per base box)

Tinplate (1.50 lb.) cokes	\$5.95	\$8.95	\$8.95	\$8.95
Tinplate, electro (0.50 lb.)	7.65	7.65	7.65	7.65
Special coated mfg. ternes	7.75	7.75	7.75	7.75

Bars and Shapes: (per pound)

Merchant bars	4.312¢	4.312¢	4.312¢	4.15¢
Cold-finished bars	5.40	5.40	5.40	5.20
Alloy bars	5.075	5.075	5.075	4.875
Structural shapes	4.25	4.25	4.25	4.10
Stainless bars (No. 302)	35.50	35.50	35.50	35.50
Wrought iron bars	10.40	10.40	10.40	10.40

Wire: (per pound)

Bright wire	5.75¢	5.75¢	5.75¢	5.525¢
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Rails: (per 100 lb.)

Heavy rails	\$4.45	\$4.45	\$4.45	\$4.325
Light rails	5.35	5.35	5.35	5.20

Semifinished Steel: (per net ton)

Rerolling billets	\$64.00	\$64.00	\$64.00	\$62.00
Slabs, rerolling	64.00	64.00	64.00	62.00
Forging billets	78.00	78.00	78.00	75.50
Alloy blooms, billets, slabs	86.00	86.00	86.00	82.00

Wire Rod and Skelp: (per pound)

Wire rods	4.675¢	4.675¢	4.675¢	4.525¢
Skelp	3.90	3.90	3.90	3.75

Finished Steel Composite: (per pound)

Base price	4.801¢	4.801¢	4.801¢	4.684¢
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Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

← To identify producers, see Key on P. 235 →

Base price cents per lb. f.o.b. mill

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem B3	58.00	58.50	59.00	59.50	
Birmingham R3	52.38	52.88			
Birmingham W9	52.38	52.88			
Birmingham U4	52.38	52.88	56.50		
Buffalo R3	56.00	56.50	57.00		
Buffalo I11	56.00	56.50	57.00		
Buffalo W6	56.00	56.50	57.00		
Chicago I4	56.00	56.50	56.50	57.00	
Cleveland A5	56.00	56.50	56.50	57.00	61.00
Cleveland R3	56.00	56.50	56.50	57.00	
Daingerfield L3	52.50	52.50	52.50		
Duluth I4	56.00	56.50	56.50	57.00	
Erie I4	56.00	56.50	56.50	57.00	
Everett M6	61.00	61.50			
Fontana K1	62.50				
Genoa, Utah C7	56.00	56.50			
Granite City G2	57.90	58.40	58.90		
Hubbard Y1			56.50		
Minnequa C6	58.00	59.00	59.00		
Monessen P6	56.00				
Neville Isl. P4	56.00	56.50	56.50		
Pittsburgh U1	56.00			57.00	
Sharpville S3	56.00	56.50	56.50	57.00	
So. Chicago R3	56.00		56.50		
Steelton B3	58.00	58.50	59.00	59.50	64.00
Swedenland A2	58.00	58.50	59.00	59.50	
Tellico I4	56.00	56.50	56.50	57.00	
Troy, N. Y. R3	58.00	58.50	59.00	59.50	64.00
Youngstown Y1			56.50	57.00	
N. Tonawanda T1			56.50	57.00	

DIFFERENTIALS: Add 5¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese over 1 pct, \$2 per ton for 0.5 to 0.75 pct nickel, \$1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus content 0.70 and over.

Silvery iron: Buffalo, H1, \$68.25; Jackson, J1, G1 \$67.00. Add \$1.50 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add \$1 per ton for 0.75 pct or more phosphorus. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferrosilicon prices are \$1 over comparable silvery iron.

Product	301	302	303	304	316	321	347	410	416	431
Ingots, rerolling	16.25	17.25	18.75	18.25	28.00	22.75	24.50	14.00		14.25
Slabs, billets, rerolling	20.50	22.75	24.75	23.75	36.25	29.50	32.25	18.25		18.50
Forg. discs, die blocks, rings	38.50	38.50	41.50	40.50	60.00	45.50	50.75	31.00	31.75	31.75
Billets, forging	29.50	29.75	32.25	31.00	46.50	35.25	39.50	24.00	24.50	24.50
Bars, wires, structurals	35.25	35.50	38.25	37.25	55.50	42.00	46.75	28.75	29.25	29.25
Plates	37.25	37.50	39.75	39.75	58.75	45.75	51.25	30.00	30.50	30.50
Sheets	41.25	41.50	48.75	43.75	62.75	50.50	59.25	34.25	41.25	34.75
Strip, hot-rolled	29.75	32.00	36.75	34.25	53.25	41.00	46.50	26.25		27.00
Strip, cold-rolled	38.25	41.50	45.50	43.75	62.75	50.50	59.25	34.25	41.25	34.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., C11; Brackenridge, Pa., A3; Butler, Pa., A7; McKeesport, Pa., U1; Washington, Pa., W2, J1; Baltimore, E1; Middletown, O., A7; Massillon, O., R3; Gary, U1; Bridgeville, Pa., U2; New Castle, Ind., J2; Ft. Wayne, J1.

Strip: Midland, Pa., C11; Cleveland, A5; Carnegie, Pa., S9; McKeesport, Pa., F1; Reading, Pa., C2; Washington, Pa., W2; W. Leechburg, Pa., A3; Bridgeville, Pa., U2; Detroit, M2; Canton-Massillon, O., R3; Middletown, O., A7; Harrison, N. J., D3; Youngstown, C5; Sharon, Pa., S1; Butler, Pa., A7; Wallingford, Conn., U3 (25¢ per lb higher); New Bedford, Mass., R6.

Bar: Baltimore, A7; Duquesne, Pa., U1; Munhall, Pa., U1; Reading, Pa., C2; Titusville, Pa., U2; Washington, Pa., J2; McKeesport, Pa., U1; Ft. Wayne, J4; Harrison, N. J., D3; Baltimore, A7; Dunkirk, N. Y., A3; Massillon, O., R3; Chicago, U1; Syracuse, N. Y., A3; Watervliet, N. Y., A3; Waukegan, A5; Canton, O., T5; Ft. Wayne, J4.

Wire: Waukegan, A5; Massillon, O., R3; McKeesport, Pa., F1; Ft. Wayne, J4; Harrison, N. J., D3; Baltimore, A7; Dunkirk, A3; Monessen, P1; Syracuse, C11; Bridgeville, U2.

Structural: Baltimore, A7; Massillon, O., R3; Chicago, Ill., J4; Watervliet, N. Y., A3; Syracuse, C11.

Plates: Brackenridge, Pa., A3; Chicago, U1; Munhall, Pa., U1; Midland, Pa., C11; New Castle, Ind., J2; Middle town, A7; Washington, Pa., J2; Cleveland, Massillon, R3; Coatesville, Pa., C75.

Forged discs, die blocks, rings: Pittsburgh, C11; Syracuse, C11; Ferndale, Mich., A3; Washington, Pa., J2.

Forging kilets: Midland, Pa., C11; Baltimore, A7; Washington, Pa., J2; McKeesport, F1; Massillon, Canton, O., R3; Watervliet, A3; Pittsburgh, Chicago, U1; Syracuse, C11.

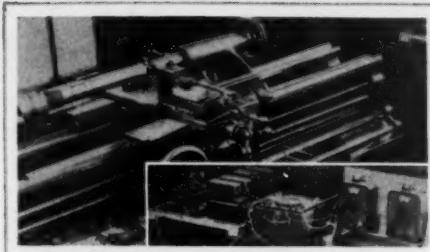
Now...Picture These Advantages for Your Tools and Dies!

Make this 3-Minute Check...Discover what has been put into a dependable die steel to help you get better die performance, lower costs!

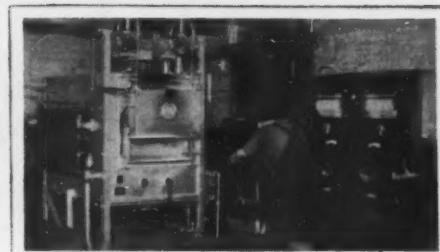
Improving existing die steels and developing new ones to meet the need for lower production costs, has been a challenge met by Carpenter. The results are modern die steels that heat treat and machine

easier to save time and money; run longer between grinds to reduce unit costs. Here are facts about *Stentor* (Oil-Hard) Die Steel—one of 12 modern steels in Carpenter's well-known Matched Set. Check what *Stentor* offers... compare it point by point with the die steel you now use. We believe you'll agree: Here is a real opportunity to put your tooling ahead of competition, take a big step to high quantity output at reduced unit costs.

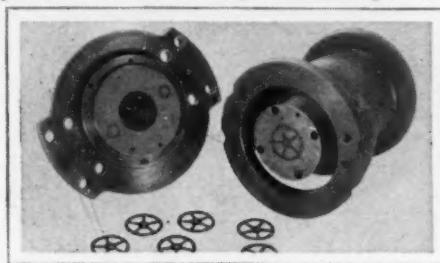
Here is what *Stentor* gives you...COMPARE it with the die steel you use...



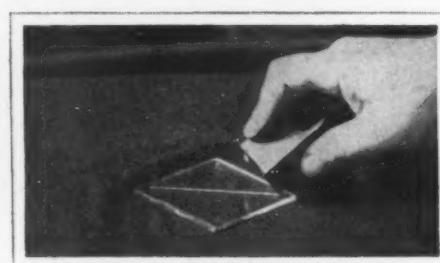
Easy Machinability. Two steels were put through this machining test. One, a well-known oil-hardening tool steel; the other, *Stentor* with its simplified analysis. Bars tested were $3\frac{1}{2}$ " rd. with same Brinell hardness and structure. Result: With a cut .020" deep, *Stentor* proved to be 11% easier to machine than the other steel. Does the steel you use provide this extra economy in machining?



Simplified Heat Treating. Because of *Stentor*'s simplified analysis, it hardens from the low temperature of 1420° to 1450° F. This low temperature reduces dangers of size change and decarburization—holds warpage to an absolute minimum. How does the steel you use compare with this?



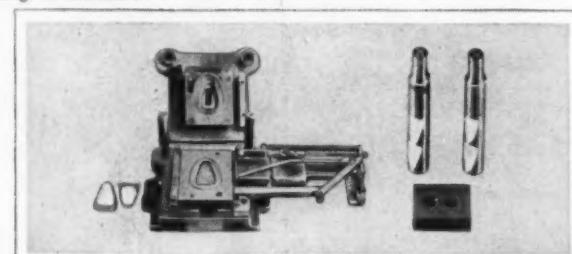
Safety and Accuracy in Hardening. This punch and die blanks $1.342^{\prime\prime}$ dia. timing mechanism gears having 120 teeth/90 pitch, made from 24 ga. $\frac{3}{4}$ -hard brass. Customer reports: "In heat treatment the *Stentor* die moved only .00005" on the max. dia. of the gear!" If the oil-hardening steel you use doesn't behave like this, it's time to change to *Stentor*!



Freedom from Decarburization. Here is a *Stentor* part as quenched and before drawing, showing absence of soft skin. This test proves that *Stentor* tools when properly hardened are hard enough, right on the surface, to scratch glass! Does the steel you use give you this positive freedom from decarb?



If you are not getting all of these advantages from the steel you use, you're missing a big opportunity to cut costs, raise output!



Full Dependability in Service. Here are just two examples of the job *Stentor* does day after day in service. Die on left gave 83 continuous hours of production between grinds compared to 10 hours with a chrome-tungsten grade! The $\frac{1}{4}$ " dia. punches shown to right above punch $\frac{3}{4}$ " thick SAE 1020 steel. After *Stentor* was used production went up 160%. How much more output could you add to your total with dependability like this?

CARPENTER STEEL

Matched Tool and Die Steels

...modern die steels engineered to meet today's requirements!

The Carpenter Steel Company, 121 W. Bern St., Reading, Pa.

Export Department: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO." Get Immediate Delivery... Call your Carpenter Mill-Branch Warehouse, Office or Distributor.



IRON AGE STEEL PRICES		<i>Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.</i>													
	(Effective Sept. 14, 1954)	BILLETS, BLOOMS, SLABS			PIL- ING	SHAPES STRUCTURALS			STRIP						
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton		Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide- Flange	Hot- rolled	Cold- rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot- rolled	Alloy Cold- rolled
	Bethlehem, Pa.			\$86.00 B3			4.30 B3	6.45 B3	4.30 B3						
	Buffalo, N. Y.	\$64.00 B3	\$78.00 B3, R3	\$86.00 B3, R3	5.075 B3		4.30 B3	6.45 B3	4.30 B3	4.05 B3, R3	5.75 B3, R7	6.15 B3	8.425 B3		
	Claymont, Del.														
	Coatesville, Pa.														
	Conshohocken, Pa.									4.175 A2		6.15 A2			
	New Bedford, Mass.										6.20 R6				
	Harrison, N. J.														
	Johnstown, Pa.	\$64.00 B3	\$78.00 B3	\$86.00 B3			4.30 B3	6.45 B3		4.05 B3					
	Fairless, Pa.														
	New Haven, Conn.											6.20 D1 6.50 A5			
	Phoenixville, Pa.						3.95 P2		3.95 P2						
	Sparrows Pt., Md.									4.05 B3	5.75 B3	6.15 B3	8.425 B3		
	Wallingford, Conn.										6.20 W1				
	Worcester, Mass. Pawtucket, R. I.											6.30 N7 6.60 A5			12.75 A5 12.80 N7
	Alton, Ill.									4.225 L1					
	Ashland, Ky.									4.05 A7					
	Canton-Massillon, Dever, Ohio		\$88.00 R3	\$82.00 T5 \$86.00 R3											12.45 C1
	Chicago, Ill.	\$64.00 U1	\$78.00 R3, U1, W8	\$86.00 U1, W8, R3	5.075 U1	4.25 U1, W8	6.40 U1, Y1	4.25 U1	4.05 A1, N4, W8	5.85 A1					
	Cleveland, Ohio										5.75 A5, J3		8.60 A5		12.45 A5
	Detroit, Mich.				\$86.00 R5					4.20 G3, M2	5.90 D1, D2, G3, M2, P11	6.30 G3	8.35 D2 8.75 G3		
	Duluth, Minn.														
	Gary, Ind. Harbor, Indiana	\$64.00 U1	\$78.00 U1	\$86.00 U1, Y1	5.075 J3	4.25 J3, U1	6.40 U1, J3		4.05 J3, U1, Y1	6.00 J3	6.15 U1, J3, Y1	8.60 Y1	6.70 U1, Y1		
	Sterling, Ill.									4.15 N4					
	Indianapolis, Ind.										5.90 C3				
	Newport, Ky.														6.70 NS
	Middletown, Ohio									5.75 A7					
	Niles, Warren, Ohio Sharon, Pa.									4.05 S1, R3	5.75 S1, R3, T4	6.15 S1, R3	8.60 S1, R3	6.70 S1	12.45 S1
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	\$64.00 U1, J3	\$78.00 J3, U1, C11	\$86.00 U1, C11	5.075 U1	4.25 J3, U1	6.40 J3, U1	4.25 U1	4.05 S7, P6	5.75 B4, J3 S7				6.70 S9	12.45 S9
	Portsmouth, Ohio									4.05 P7	5.75 P7				
	Weirton, Wheeling, Follansbee, W. Va.						4.25 W3			4.05 W3	5.75 F3, W3	6.15 W3	8.60 W3		
	Youngstown, Ohio		\$78.00 C10	\$86.00 Y1, C10			4.25 Y1	6.40 Y1		4.05 U1, Y1	5.75 Y1, C5	6.15 U1, Y1	8.60 Y1	6.70 U1, Y1	12.45 C5
	Fontana, Cal.	\$72.00 K1	\$86.00 K1	\$105.00 K1			4.90 K1	7.05 K1	5.25 K1	4.825 K1	7.65 K1	7.25 K1		8.10 K1	14.55 K1
	Geneva, Utah		\$78.00 C7				4.25 C7	6.40 C7							
	Kansas City, Mo.						4.85 S2	7.00 S2		4.65 S2				7.30 S2	
	Los Angeles, Torrance, Cal.		\$87.50 B2	\$106.00 B2			4.95 B2, C7	7.10 B2		4.80 B2, C7	7.80 C7				
	Minnequa, Colo.						4.70 C6			5.15 C6					
	San Francisco, Niles, Pittsburg, Cal.		\$87.50 B2				4.90 B2 4.95 P9	7.05 B2		4.80 B2, C7					
	Seattle, Wash.		\$91.50 B2				5.00 B2	7.15 B2		5.05 B2, P12					
	Atlanta, Ga.									4.25 A8					
	Fairfield, Ala. City, Birmingham, Ala.	\$64.00 T2	\$78.00 T2				4.25 T2, C16 4.28 R3	6.40 T2		4.05 R3, T2, C16		6.15 T2			
	Houston, Tex.		\$85.00 S2	\$93.00 S2			4.65 S2	6.85 S2		4.45 S2				7.10 S2	

**STEEL
PRICES**
(Effective
Sept. 14, 1954) *Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.***SHEETS****WIRE
ROD****TINPLATE†****BLACK
PLATE**

Hot-rolled 18 ga. & hvyr.	Cold- rolled	Galvanized 10 ga.	Enamel- ing 12 ga.	Long Terne 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot- rolled 19 ga.		Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box	Holloware Enameling 29 ga.
Bethlehem, Pa.												
Buffalo, N. Y.	<i>4.05 B3</i>	<i>4.95 B3</i>				<i>6.10 B3</i>	<i>7.50 B3</i>			<i>4.675 W6</i>		
Claymont, Del.												
Coatesville, Pa.												
Conshheoken, Pa.	<i>4.10 A2</i>					<i>6.15 A2</i>						
Harrisburg, Pa.												
Hartford, Conn.												
Johnstown, Pa.										<i>4.675 B3</i>		
Fairless, Pa.	<i>4.10 U1</i>	<i>5.00 U1</i>				<i>6.15 U1</i>	<i>7.55 U1</i>				<i>\$8.80 U1</i>	<i>\$7.50 U1</i>
New Haven, Conn.												
Phoenixville, Pa.												
Sparrows Pt., Md.	<i>4.05 B3</i>	<i>4.95 B3</i>	<i>5.45 B3</i>			<i>6.10 B3</i>	<i>7.50 B3</i>	<i>8.20 B3</i>		<i>4.775 B3</i>	<i>\$8.80 B3</i>	<i>\$7.50 B3</i>
Worcester, Mass.										<i>4.975 A5</i>		
Trenton, N. J.												
Alton, Ill.										<i>4.85 L1</i>		
Ashland, Ky.	<i>4.05 A7</i>		<i>5.45 A7</i>	<i>5.375 A7</i>								
Canton-Massillon, Dever, Ohio			<i>5.45 R1, R3</i>							<i>5.175 R1</i>		
Chicago, Joliet, Ill.	<i>4.05 A1, W8</i>					<i>6.10 U1</i>				<i>4.675 A5, N4, R3</i>		
Sterling, Ill.										<i>4.775 N4</i>		
Cleveland, Ohio	<i>4.05 J3, R3</i>	<i>4.95 J3, R3</i>		<i>5.375 R3</i>		<i>6.10 J3, R3</i>	<i>7.50 J3, R3</i>			<i>4.675 A5</i>		
Detroit, Mich.	<i>4.20 G3, M2</i>	<i>5.10 G3</i>				<i>6.25 G3</i>	<i>7.85 G3</i>					
Newport, Ky.	<i>4.05 N5</i>		<i>5.45 N5</i>									
Gary, Ind. Harbor, Indiana	<i>4.05 J3, U1, Y1</i>	<i>4.95 J3, U1, Y1</i>	<i>5.45 U1, J3</i>	<i>5.375 J3, U1</i>	<i>5.85 U1</i>	<i>6.10 U1, J3, Y1</i>	<i>7.50 U1, Y1</i>			<i>4.675 Y1</i>	<i>\$8.70 J3, U1, Y1</i>	<i>\$7.40 J3, U1, Y1</i>
Granite City, Ill.	<i>4.25 G2</i>	<i>5.15 G2</i>	<i>5.65 G2</i>	<i>5.575 G2</i>								<i>6.10 U1</i>
Kokomo, Ind.	<i>4.15 C9</i>		<i>5.55 C9</i>							<i>5.20 C9</i>	<i>4.775 C9</i>	
Mansfield, Ohio						<i>5.85 E2</i>				<i>5.175 E2</i>		
Middletown, Ohio		<i>4.95 A7</i>		<i>5.375 A7</i>	<i>5.85 A7</i>							
Niles, Ohio Sharon, Pa.	<i>4.05 S1, R3 5.30 N3</i>	<i>4.95 R3 5.975 N3</i>	<i>5.45 N3</i>	<i>6.725 N3</i>	<i>5.85 N3</i>	<i>6.10 S1, R3</i>	<i>7.50 R3</i>				<i>\$8.70 R3</i>	<i>\$7.40 R3</i>
Pittsburgh, Pa. Midland, Pa. Butler, Pa.	<i>4.05 J3, U1, P6</i>	<i>4.95 J3, U1, P6</i>	<i>5.45 U1</i>	<i>5.375 U1</i>		<i>6.10 J3, U1</i>	<i>7.50 J3, U1</i>	<i>8.20 U1</i>		<i>4.675 A5 4.875 P6</i>	<i>\$8.70 J3, U1</i>	<i>\$7.40 J3, U1</i>
Portsmouth, Ohio	<i>4.05 P7</i>	<i>4.95 P7</i>								<i>4.675 P7</i>		
Weirton, Wheeling, Follansbee, W. Va.	<i>4.05 W3, W5</i>	<i>4.95 W3, W5, F3</i>	<i>5.45 W3, W5</i>		<i>5.85 W3, W5</i>	<i>6.10 W3</i>	<i>7.50 W3</i>				<i>\$8.70 W3, W5</i>	<i>\$7.40 W3, W5</i>
Youngstown, Ohio	<i>4.05 U1, Y1</i>	<i>4.95 Y1</i>		<i>5.375 Y1</i>		<i>6.10 U1, Y1</i>	<i>7.50 Y1</i>			<i>4.675 Y1</i>		
Fontana, Cal.	<i>4.825 K1</i>	<i>6.05 K1</i>				<i>6.875 K1</i>	<i>8.55 K1</i>			<i>5.475 K1</i>		
Geneva, Utah	<i>4.15 C7</i>					<i>6.45 C7</i>						
Kansas City, Mo.												
Los Angeles, Terrance, Cal.										<i>5.475 C7, B2</i>		
Minnequa, Colo.										<i>4.925 C6</i>		
San Francisco, Niles, Pittsburg, Cal.	<i>4.75 C7</i>	<i>5.90 C7</i>	<i>6.20 C7</i>							<i>5.325 C7</i>	<i>\$9.45 C7</i>	<i>\$8.15 C7</i>
Seattle, Wash.												
Atlanta, Ga.												
Fairfield, Ala. Alabama City, Ala.	<i>4.05 R3, T2</i>	<i>4.95 T2</i>	<i>5.45 R3, T2</i>			<i>6.10 T2</i>				<i>5.35 R3</i>	<i>4.675 T2, R3</i>	<i>\$8.80 T2</i>
Houston, Texas	<i>4.45 S2</i>									<i>5.075 S2</i>		

**STEEL
PRICES**
*(Effective
Sept. 14, 1954)*
Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES			WIRE	
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mig'l Bright
EAST	Bethlehem, Pa.				5.075 B3	6.625 B3	6.45 B3					
	Buffalo, N. Y.	4.30 B3 4.33 R3	4.30 B3 4.33 R3	5.45 B5	5.075 B3 5.105 R3	6.625 B3, B5	6.45 B3	4.225 B3			6.45 B3	5.75 W6
	Claymont, Del.							4.225 C4		5.80 C4		
	Coatesville, Pa.							4.225 L4		5.80 L4		
	Canonsburg, Pa.							4.225 A2	5.275 A2		6.45 A2	
	Harrisburg, Pa.							3.975 C3	5.275 C3			
	Hartford, Conn.			5.90 R3		6.925 R3						
	Johnstown, Pa.	4.30 B3	4.30 B3		5.075 B3		6.45 B3	4.225 B3		5.80 B3	6.45 B3	5.75 B3
	Fairless, Pa.	4.45 U1	4.45 U1			5.225 U1						
	Newark, N. J.				5.85 W10		6.80 W10					
	Camden, N. J.				5.85 P10							
	Putnam, Conn.				5.85 W10							
	Sparrows Pt., Md.		4.30 B3					4.225 B3		5.80 B3	6.45 B3	5.85 B3
	Palmer, Worcester, Readville, Mansfield, Mass.				5.85 W11 5.95 B5, C14		6.925 A5, B5 7.075 B5					6.05 A5, W6
	Alton, Ill.	4.50 L1										5.925 L1
	Ashland, Newport, Ky.							4.225 A7, N5		5.80 N5		
MIDDLE WEST	Canton-Massillon, Mansfield, Ohio	4.46 R3		5.40 R2 5.44 R3	4.875 T5 5.115 R3	6.325 T5 6.625 R2 6.665 R3		4.225 E2				
	Chicago, Joliet, Ill.	4.30 U1, N4, W8 4.37 R3	4.30 N4 4.37 R3	5.40 A5, W10, W8, B5, L2	5.075 U1, W8 5.145 R3	6.625 A5, W8, W10, L2, B5		4.225 U1, W8, I3, A1	5.275 U1	5.80 U1	6.45 U1	5.75 A5, R3, N4, W7
	Cleveland, Ohio	4.36 R3	4.36 R3	5.40 A5, C13		6.625 A5 6.665 C13	6.45 R3	4.225 J3 4.285 R3	5.275 J3		6.45 J3, R3	5.75 A5, C13
	Detroit, Mich.	4.45 R5, G3		5.40 R5 5.60 B5, P8 5.65 P5	5.075 R5 5.225 G3	6.625 R5 6.825 B5, P3, P8	6.60 G3	4.375 G3			6.60 G3	
	Duluth, Minn.											5.75 A5
	Gary, Ind. Harbor, Crawfordsville	4.30 I3, U1, Y1	4.30 I3, U1, Y1	5.40 M5 5.47 R3	5.075 I3, U1, Y1	6.525 M5 6.695 R3	6.45 U1, I3, Y1	4.225 I3, U1, Y1	5.275 I3	5.80 U1, Y1	6.45 U1, I3, Y1	5.85 M4
	Granite City, Ill.							4.425 G2				5.85 C9
	Kokomo, Ind.											
	Sterling, Ill.	4.40 N4	4.40 N4									5.85 N4
	Niles, Ohio Sharon, Pa.	4.34 R3					6.45 R3	4.225 S1		5.80 S1	6.45 S1	
	Pittsburgh, Pa. Midland, Pa.	4.30 J3, U1, C11	4.30 J3, U1	5.40 A5, C8, C11 J3, W10, B4 5.46 R3	5.075 U1, C11	6.625 A5, C11 W10, C8 6.685 R3	6.45 J3, U1	4.225 J3, U1	5.275 U1	5.80 U1	6.45 J3, U1	5.75 A5, J1, P6
	Portsmouth, Ohio											5.75 P7
	Weirton, Wheeling, Follansbee, W. Va.		4.30 W3					4.225 W3, W5				
	Youngstown, Ohio	4.30 U1, Y1, C10 4.35 R3	4.30 U1, Y1 4.35 R3	5.40 F2, Y1, C10	5.075 U1, Y1, C10	6.625 Y1, C10 6.665 F2	6.45 U1, Y1	4.225 U1, Y1		5.80 Y1	6.45 Y1	5.75 Y1
WEST	Emeryville, Cal.	5.05 JS	5.05 JS									
	Fontana, Cal.	5.00 K1	5.00 K1		6.125 K1		7.70 K1	4.875 K1		6.45 K1	7.15 K1	
	Geneva, Utah							4.225 C7			6.45 C7	
	Kansas City, Mo.	4.90 S2	4.90 S2		5.675 S2		7.85 S2					6.35 S2
	Los Angeles, Torrance, Cal.	5.00 B2, C7	5.00 B2, C7	6.85 R3	6.125 B2		7.15 B2					6.70 B2
	Minneapolis, Colo.	4.75 C6	4.75 C6					5.075 C6				5.90 C6
	Portland, Ore.	4.90 O2										
	San Francisco, Niles, Pittsburg, Cal.	5.00 C7, P9 5.05 B2	5.00 C7, P9 5.05 B2				7.20 B2					6.70 C7
	Seattle, Wash.	5.05 B2, P12, N6	5.05 B2, P12 N6				7.20 B2	5.125 B2		6.70 B2	7.35 B2	
	Atlanta, Ga.	4.50 A8	4.50 A8									5.95 A8
SOUTH	Fairfield, Ala. City, Birmingham, Ala.	4.30 T2, C16 4.33 R3	4.30 T2, C16 4.33 R3				6.45 T2	4.225 T2 4.255 R3		6.45 T2	5.75 R3, T2	
	Houston, Ft. Worth, Lone Star, Tex.	4.70 S2	4.70 S2		5.475 S2		6.85 S2	4.40 L3 4.625 S2		6.20 S2	6.85 S2	6.25 S2

Steel Prices

(Effective Sept. 14, 1954)

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
 A2 Alan Wood Steel Co., Conshohocken, Pa.
 A3 Allegheny Ludlum Steel Corp., Pittsburgh
 A4 American Climatite Co., Carnegie, Pa.
 A5 American Steel & Wire Div., Cleveland
 A6 Angell Nail & Chaplet Co., Cleveland
 A7 Armc Steel Corp., Middletown, O.
 A8 Atlantic Steel Co., Atlanta, Ga.
 B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
 B2 Bethlehem Pacific Coast Steel Corp., San Francisco
 B3 Bethlehem Steel Co., Bethlehem, Pa.
 B4 Blair Strip Steel Co., New Castle, Pa.
 B5 Bliss & Laughlin, Inc., Harvey, Ill.
 C1 Calstrip Steel Corp., Los Angeles
 C2 Carpenter Steel Co., Reading, Pa.
 C3 Central Iron & Steel Co., Harrisburg, Pa.
 C4 Claymont Products Dept., Claymont, Del.
 C5 Cold Metal Products Co., Youngstown, O.
 C6 Colorado Fuel & Iron Corp., Denver
 C7 Columbia Geneva Steel Div., San Francisco
 C8 Columbia Steel & Shafting Co., Pittsburgh
 C9 Continental Steel Corp., Kokomo, Ind.
 C10 Copperweld Steel Co., Pittsburgh, Pa.
 C11 Crucible Steel Co. of America, New York
 C12 Cumberland Steel Co., Cumberland, Md.
 C13 Cuyahoga Steel & Wire Co., Cleveland
 C14 Compressed Steel Shafting Co., Readville, Mass.
 C15 G. O. Carlson, Inc., Thorndale, Pa.
 C16 Coopers Steel Div., Birmingham
 D1 Detroit Steel Corp., Detroit
 D2 Detroit Tube & Steel Div., Detroit
 D3 Drive Harris Co., Harrison, N. J.
 D4 Dickson Weatherproof Nail Co., Evanston, Ill.
 E1 Eastern Stainless Steel Corp., Baltimore
 E2 Empire Steel Co., Mansfield, O.
 F1 Firth Sterling, Inc., McKeesport, Pa.
 F2 Fitzsimmons Steel Corp., Youngstown
 F3 Follansbee Steel Corp., Follansbee, W. Va.
 G1 Globe Iron Co., Jackson, O.

G2 Granite City Steel Co., Granite City, Ill.
 G3 Great Lakes Steel Corp., Detroit
 G4 Greer Steel Co., Dover, O.
 H1 Hanna Furnace Corp., Detroit
 I2 Ingersoll Steel Div., Chicago
 I3 Inland Steel Co., Chicago
 I4 Interlake Iron Corp., Cleveland
 J1 Jackson Iron & Steel Co., Jackson, O.
 J2 Jessop Steel Corp., Washington, Pa.
 J3 Jones & Laughlin Steel Corp., Pittsburgh
 J4 Joslyn Mfg. & Supply Co., Chicago
 J5 Judson Steel Corp., Emeryville, Calif.
 K1 Kaiser Steel Corp., Fontana, Cal.
 K2 Keystone Steel & Wire Co., Peoria
 K3 Koppers Co., Granite City, Ill.
 L1 Laclede Steel Co., St. Louis
 L2 La Salle Steel Co., Chicago
 L3 Lone Star Steel Co., Dallas
 L4 Lukens Steel Co., Coatesville, Pa.
 M1 Mahoning Valley Steel Co., Niles, O.
 M2 McLouth Steel Corp., Detroit
 M3 Mercer Tube & Mfg. Co., Sharon, Pa.
 M4 Mid-States Steel & Wire Co., Crawfordville, Ind.
 M5 Monarch Steel Co., Inc., Hammond, Ind.
 M6 Mystic Iron Works, Everett, Mass.
 N1 National Supply Co., Pittsburgh
 N2 National Tube Div., Pittsburgh
 N3 Niles Rolling Mill Div., Niles, O.
 N4 Northwestern Steel & Wire Co., Sterling, Ill.
 N5 Newport Steel Corp., Newport, Ky.
 N6 Northwest Steel Rolling Mills, Seattle
 N7 Newman Crosby Steel Co., Pawtucket, R. I.
 O1 Oliver Iron & Steel Co., Pittsburgh
 O2 Oregon Steel Mills, Portland
 P1 Page Steel & Wire Div., Monessen, Pa.
 P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
 P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
 P4 Pittsburgh Coke & Chemical Co., Pittsburgh
 P5 Pittsburgh Screw & Bolt Co., Pittsburgh
 P6 Pittsburgh Steel Co., Pittsburgh
 P7 Portsmouth Div., Detroit Steel Corp., Detroit
 P8 Plymouth Steel Co., Detroit
 P9 Pacific States Steel Co., Niles, Cal.
 P10 Precision Drawn Steel Co., Camden, N. J.
 P11 Production Steel Strip Corp., Detroit
 P12 Pacific Steel Rolling Mills, Seattle
 R1 Reeves Steel & Mfg. Co., Dover, O.
 R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
 R3 Republic Steel Corp., Cleveland
 R4 Roebling Sons Co., John A., Trenton, N. J.
 R5 Rotary Electric Steel Co., Detroit
 R6 Rodney Metals, Inc., New Bedford, Mass.
 R7 Rome Strip Steel Co., Rome, N. Y.
 S1 Sharon Steel Corp., Sharon, Pa.
 S2 Sheffield Steel Corp., Kansas City
 S3 Shenango Furnace Co., Pittsburgh
 S4 Simonds Saw & Steel Co., Fitchburg, Mass.
 S5 Sweet's Steel Co., Williamsport, Pa.
 S6 Standard Forging Corp., Chicago
 S7 Stanley Works, New Britain, Conn.
 S8 Superior Drawn Steel Co., Monaca, Pa.
 S9 Superior Steel Corp., Carnegie, Pa.
 T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
 T2 Tennessee Coal & Iron Div., Fairfield
 T3 Tennessee Products & Chem. Corp., Nashville
 T4 Thomas Strip Div., Warren, O.
 T5 Timken Steel & Tube Div., Canton, O.
 T6 Tremont Nail Co., Wacham, Mass.
 T7 Texas Steel Co., Fort Worth
 U1 United States Steel Corp., Pittsburgh
 U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
 U3 Ulrich Stainless Steels, Wallingford, Conn.
 U4 U. S. Pipe & Foundry Co., Birmingham
 W1 Wallingford Steel Co., Wallingford, Conn.
 W2 Washington Steel Corp., Washington, Pa.
 W3 Weirton Steel Co., Weirton, W. Va.
 W4 Wheatland Tube Co., Wheatland, Pa.
 W5 Wheeling Steel Corp., Wheeling, W. Va.
 W6 Wickwire Spencer Steel Div., Buffalo
 W7 Wilson Steel & Wire Co., Chicago
 W8 Wisconsin Steel Co., S. Chicago, Ill.
 W9 Woodward Iron Co., Woodward, Ala.
 W10 Wycoff Steel Co., Pittsburgh
 W11 Worcester Pressed Steel Co., Worcester, Mass.
 Y1 Youngstown Sheet & Tube Co., Youngstown

PIPE AND TUBING

Base discounts (per cent) f.o.b. mills. Base price about \$200 per net ton.

	BUTTWELD														SEAMLESS										
	1/2 in.		3/4 in.		1 in.		1 1/4 in.		1 1/2 in.		2 in.		2 1/2-3 in.		2 in.		2 1/2 in.		3 in.		3 1/2-4 in.				
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	
STANDARD T. & C.																									
Sparrows Pt. B3	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0
Youngstown R3	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0
Fontana K1	10.75	+4.5	13.75	+0.5	16.25	3.0	18.75	3.75	19.25	4.75	19.75	5.25	21.25	5.0
Pittsburgh J3	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	+1.50	17.5	0.75	20.0	3.25	21.5	4.75	.....	.....
Alien, Ill. L1	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0
Sharon M3	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	+1.50	17.5	0.75	20.0	3.25	21.5	4.75	.....	.....
Fairless N2	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0	13.5	+1.50	17.5	0.75	20.0	3.25	21.5	4.75	.....	.....
Pittsburgh NI	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	+1.50	17.5	0.75	20.0	3.25	21.5	4.75	.....	.....
Wheeling W5	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	+1.50	17.5	0.75	20.0	3.25	21.5	4.75	.....	.....
Wheatland W4	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	+1.50	17.5	0.75	20.0	3.25	21.5	4.75	.....	.....
Youngstown Y1	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	+1.50	17.5	0.75	20.0	3.25	21.5	4.75	.....	.....
Indiana Harbor Y1	22.75	7.5	25.75	11.5	28.25	15.0	30.75	15.75	31.25	16.75	31.75	17.25	33.25	17.0	13.5	+1.50	17.5	0.75	20.0	3.25	21.5	4.75	.....	.....
Lorain N2	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	+1.50	17.5	0.75	20.0	3.25	21.5	4.75	.....	.....
EXTRA STRONG PLAIN ENDS																									
Sparrows Pt. B3	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	18.75	32.75	19.25	33.25	18.0
Youngstown R3	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0
Fairless N2	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	18.75	32.75	19.25	33.25	18.0
Fontana K1	14.25	18.25	20.25	20.75	21.25	21.75	22.25
Pittsburgh J3	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	14.0	19.0	3.25	21.5	5.75	26.5	10.75	.....	.....	.....
Alien, Ill. L1	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	18.75	32.75	19.25	33.25	18.0
Sharon M3	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	14.0	19.0	3.25	21.5	5.75	26.5	10.75	.....	.....	.....
Pittsburgh NI	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	14.0	19.0	3.25	21.5	5.75	26.5	10.75	.....	.....	.....
Wheeling W5	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	14.0	19.0	3.25	21.5	5.75	26.5	10.75	.....	.....	.....
Wheatland W4	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	14.0	19.0	3.25	21.5	5.75	26.5	10.75	.....	.....	.....
Youngstown Y1	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	14.0	19.0	3.25	21.5	5.75	26.5	10.75	.....	.....	.....
Indiana Harbor Y1	26.25	12.5	30.25	16.5	32.25	20.0	32.75	18.75	33.25	19.75	33.75	20.75	34.25	19.0	14.0	19.0	3.25	21.5	5.75	26.5	10.75	.....	.....	.....
Lorain N2	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	14.0	19.0	3.25	21.5	5.75	26.5	10.75	.....	.....	.....

Threads only, butt-welded and seamless 2 1/4 pt. higher discount. Plain ends, butt-welded and seamless, 3-in. and under, 4 1/2 pt. higher discount. Butt-weld jobbers' discount, 5 pt. Galvanized discounts based on zinc price in range of over 9¢ to 11¢ incl. per lb., East St. Louis. For each 2¢ change in zinc, discounts vary as follows: 1 1/2, 3/4 and 1-in., 2 pt.; 1 1/4, 1 1/2 and 2-in., 1 pt. e.g., zinc price in range of over 11¢ to 13¢ would lower discounts; zinc price in range of over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.50¢ per lb.

Steel Prices

(Effective Sept. 15, 1954)

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Beasemmer UI	4.45	5.35	5.425				
Se. Chicago R3				7.30			
Ensign T2	4.45	5.35					
Fairfield T2	5.35			7.30	5.275		
Gary UI	4.45	5.35			5.275		
Ind. Harbor I3	4.45		5.425	7.30	5.275		
Johnstown B3		5.35					
Joliet UI		5.35	5.425				
Kansas City S2				7.30			
Lackawanna B3	4.45	5.35	5.425		5.275		
Minnequa C6	4.45	5.85	5.425	7.30	5.275		
Pittsburgh O1				11.00	11.50		
Pittsburgh P5				11.00	11.50		
Pittsburgh J3				7.30			
Seattle B2				7.30	5.425	11.50	
Steeders B3	4.45		5.425		5.275		
Struthers Y1				7.30			
Torrance C7					5.425		
Williamsport S5	5.35						
Youngstown R3				7.30			

ELECTRICAL SHEETS

F.o.b. Mill Cents Per Lb	22-Gage	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length)	
			Semi- Processed	Fully Processed
Field		8.025	8.225	
Armature		8.50	8.75	9.25
Elect.		9.10	9.35	9.85
Motor		10.10	10.35	10.85
Dynamo		11.00	11.25	11.75
Trans. 72		11.95	12.20	12.70
Trans. 65		12.50		
Trans. 58		13.00	Trans. 80.....	16.40
Trans. 52		14.00	Trans. 75.....	17.10

Producing points: Beach Bottom (W5); Brackenridge (A5); Granite City (G2); Indiana Harbor (I3); Mansfield (E2); Newport, Ky. (N5); Niles, O. (N3); Vandergrift (U1); Warren, O. (R3); Zanesville (A7).

* Coils 75¢ higher.

CLAD STEEL

	Stainless-carbon No. 304, 20 pct.	Plate	Sheet
Coatesville, Pa., L4	*33.20		
Washington, Pa., J2			
Claymont, Del., C4			
New Castle, Ind., J2			32.50
Nickel-carbon			
10 pct. Coatesville, Pa., L4	38.30		
Inconel-carbon			
10 pct. Coatesville, Pa., L4	46.90		
Moneal-carbon			
10 pct. Coatesville, Pa., L4	39.70		

* Includes annealing and pickling, sandblasting.

WARE-HOUSES

City	Delivery Charge	Sheets				Strip	Plates	Shapes	Bars	Alloy Bars			
		Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled					Hot-Rolled A 4615 As Rolled	Hot-Rolled A 4140 Annealed	Cold-Drawn A 4615 As Rolled	Hot-Rolled A 4140 Annealed
Baltimore	\$.20	6.22	7.51	7.78	6.89		6.57	6.92	6.88	8.52			
Birmingham	.15	6.35	7.35	8.25	6.60	6.65	6.65	6.50	9.00				
Boston	.10	6.50	8.10	9.00									
Buffalo	.10	7.23	8.23	9.42	7.47	9.65	7.34	7.49	7.20	8.60	12.60	12.45	15.15
Chicago	.20	6.35	7.40 ³	8.80	6.70		6.65	6.70	6.50	7.85 ³	12.50	12.15 ³	14.85
Cincinnati	.15	6.49	7.37	8.25	6.86		6.81	6.91	6.75	7.80	12.55	12.15	14.90
Cleveland	.20	6.38	7.38	8.30	6.62		6.52	6.69	6.51	7.50	12.25	11.90	14.60
Denver		7.85	8.85	10.02	8.20		7.95	7.95	8.05	9.05			
Detroit	.20	6.57	7.57	8.50	6.90		6.80	7.16	6.79	7.77	12.45	12.10	14.80
Houston	.20	7.35	7.65	9.93	7.70		7.35	7.60	7.70	9.50		13.10	
Kansas City	.20	7.05	8.05	8.95	7.29		7.19	7.36	7.18	8.07		12.27	
Los Angeles	.20	7.40	9.25	9.55	7.75		7.35	7.55	7.35	10.05		13.20	
Memphis	.10	6.79	7.69		6.90		7.01	7.09	6.88	8.24			
Milwaukee	.20	6.47	7.47	8.21	6.71		6.61	6.86	6.60	7.00	12.34	11.99	14.69
New Orleans	.15	6.70	7.65	9.23	6.80		6.90	7.05	6.80	8.70			
New York	.10	6.97	7.78	8.79 ¹	7.36		6.95		10.70				
Norfolk	.20	6.98	8.46	8.99	7.56		7.27	7.38	7.37	8.73 ²			
Philadelphia	.10	6.19	7.29 ³	8.09 ⁴	6.96		6.49	6.54	6.74	8.19 ³		11.66 ³	14.61 ³
Pittsburgh	.20	6.38	7.38	8.30	6.72		6.52	6.69	6.51	7.85	12.25	11.90	14.60
Portland	.20	7.60	8.75	9.05	7.85		7.45	7.50	7.55	10.95			
Salt Lake City	.20	7.65	10.20	10.70	9.05		7.70	7.70	8.80	10.95			
San Francisco	.20	7.55	8.95	9.35	7.80		7.40	7.50	7.35	10.05		13.20	
Seattle	.00	8.10	9.80	10.15	8.20		7.80	7.75	7.80	10.95		13.65	
St. Louis	.20	6.62	7.67	8.54	6.91		6.81	7.09	6.80	7.89	12.54	12.19	14.84
St. Paul	.15	7.03	8.03	8.96	7.28		7.19	7.35	7.16	8.26		12.56	15.21

Base Quantities (Standard unless otherwise keyed): Cold finished bars; 2000 lb or over. Alloy bars; 1000 to 1999 lb. All others; 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

Exceptions: (*) 1500 to 9999 lb. (**) 1000 lb or over. (**) \$2.25 delivery. (**) 1000 to 1999 lb, \$.25 delivery.

To identify producers, see Key on preceding page.

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Col	Standard & Coated Nails		Col	Col	Col	Col	Col	Col	Col	Col	Col	
		Woven Wire Fence 9-15½ ga.	10½" Fence Posts										
Alabama City R3	137	146		155	159	6.90							
Aliquippa, Pa. J3	137	149		156	160	6.90							
Atlanta A8	139	151		157	164	7.00							
Bartonsville K2	139	151		157	164	7.00							
Buffalo W6													
Chicago, Ill. N4	137	149		155	162	6.90							
Cleveland A6	142												
Crawfordsville M4	139	151		157	159	7.00							
Donora, Pa. A5	137	146		155	159	6.90							
Duluth A5	137	146	150	155	159	6.90							
Fairfield, Ala. T2	137	146		155	161	7.00							
Galveston D4	139												
Houston S2	145	154		167	170	7.30							
Johnstown, Pa. B3	137	149		162	166	7.45							
Joliet, Ill. A5	137	146		155	160	6.90							
Kokomo, Ind. C9	139	148		157	161	7.00							
Los Angeles B2	148	158		167	171	7.50							
Kansas City S2	142	156	160	168	175	7.15							
Minnequa C6	137	151		163	166	7.45							
Moline, Ill. R3		145											
Pittsburgh, Cal. C7	156	169		179	179	7.85							
Portsmouth P7													
Rankin, Pa. A5	137	146		159	160	7.30							
Se. Chicago R3	137	146	145	155	159	6.90							
S. San Francisco C6	139			157	164	7.00							
Sparrows Pt. B3	139												
Struthers, O. Y1	143												
Worcester A5													
Williamsport, Pa. S5													

* Sold on Pittsburgh base.

C-R SPRING STEEL

F.o.b. Mill	Cents Per Lb	CARBON CONTENT				
		0.26	0.41	0.61	0.81	1.04

Miscellaneous Prices

(Effective Sept. 14, 1954)

TOOL STEEL F.o.b. Mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	5	\$1.54
18	4	1	—	5	2.245
18	4	2	—	—	1.705
1.5	4	1.5	8	—	.90
6	4	2	6	—	1.29
High-carbon chromium					.73
Oil hardened manganese					.405
Special carbon					.37
Extra carbon					.31
Regular carbon					.26
Warehouse prices on and east of Mississippi are 3.6¢ per lb higher. West of Mississippi, 5.6¢ higher.					

CAST IRON WATER PIPE

Per Net Ton	
6 to 24-in., del'd Chicago	\$111.80 to \$115.30
6 to 24-in., del'd N. Y.	115.00 to 116.00
6 to 24-in., Birmingham	98.00 to 102.50
6-in. and larger f.o.b. cars, San Francisco, Los Angeles, for all rail shipments; rail and water shipments less	\$129.50 to \$131.50
Class "A" and gas pipe, 5¢ extra; 4-in. pipe is \$5 a ton above 6-in.	

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. Prices effective July 1, 1953, to end of 1954 season.

Gross Ton

Openhearth lump	\$11.15
Old range, bessemer	10.30
Old range, nonbessemer	10.15
Mesabi, bessemer	10.05
Mesabi, nonbessemer	9.90
High phosphorus	9.90

Prices based on upper Lakes rail freight rates, Lake vessel freight rates, handling and unloading charges, and taxes thereon, in effect on June 24, 1953. Increases or decreases after such date are for buyer's account.

COKE

Furnace, beehive (f.o.b. oven)	Net-Ton Connellsville, Pa.	\$14.25 to \$14.50
Foundry, beehive (f.o.b. oven)	Connellsville, Pa.	\$16.50 to \$17.00
Foundry, oven coke	Buffalo, del'd	\$28.08
	Chicago, f.o.b.	24.50
	Detroit, f.o.b.	25.50
	New England, del'd	26.05
	Seaboard, N. J., f.o.b.	24.00
	Philadelphia, f.o.b.	23.00
	Sweden, Pa., f.o.b.	23.00
	Painesville, Ohio, f.o.b.	25.50
	Erie, Pa., f.o.b.	25.00
	Cleveland, del'd	27.48
	Cincinnati, del'd	26.56
	St. Paul, f.o.b.	23.75
	St. Louis, f.o.b.	26.00
	Birmingham, f.o.b.	22.65
	Lone Star, Tex., f.o.b.	18.50

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed

GRAPHITE			CARBON		
Diam. (in.)	Length (in.)	Price	Diam. (in.)	Length (in.)	Price
24	84	20.50	40	100, 110	8.95
20	72	20.00	35	110	8.95
12 to 18	72	20.50	30	110	8.95
7 to 10	60	21.00	24	72 to 84	9.10
8	60	23.25	20	90	8.95
4	40	26.00	17	72	9.10
3	40	27.25	14	72	9.50
2½	30	28.00	10, 12	60	10.30
2	24	43.50	8	60	10.55

BOLTS, NUTS, RIVETS, SCREWS (Base discount, f.o.b. mill)

Machine and Carriage Bolts

		Discount	
		Less	
		Case	C.
1/2 in. & smaller x 4 in. & shorter	2	22	
1/2 in. & smaller x 6 in. & shorter	+3	18	
9/16 in. & 5/8 in. x 6 in. & shorter	+4	17	
5/8 in. & larger x 6 in. & shorter	+6	15	
All diam. longer than 6 in.	+15	8	
1/2 in. & smaller x 6 in. & shorter	+3	18	
Lag, all diam. x 6 in. & shorter	6	25	
Lag, all diam. longer than 6 in.	+2	19	
Plow bolts	23	23	

Stove Bolts

Packaged, package list	44 1/2—10
Bulk bulk list*	59
* Minimum quantity per item: 15,000 pieces lengths to 3"; 5,000 pieces lengths over 3". Special finishes: Zinc, Parkerized, cadmium or nickel add 6¢ per lb net. Black oil finish add 2¢ per lb net.	

Nuts, H.P., C.P., reg. & hvy.

	Discount		
	Base	Case	
	Discount	or Keg	
5/16" or smaller	55	64	
5/16" to 1 1/8" inclusive	58	66	
1 1/4" to 1 1/2" inclusive	60	67 1/2	

C.P. Hex regular & hvy.

All sizes	55	64
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Hot Galv. Nuts (all types)

5/16" or smaller	38	50
5/16" to 1 1/2" inclusive	41	52 1/2

Finished, Semi-finished, Slotted or Cassetted Nuts

All sizes	55	66
-----------	----	----

Rivets

	Base per 100 lb	
1/2 in. & larger	\$9.25	
7/16 in. and smaller	37	

Cap Screws

	Discount	H.C. Heat	
	Bright	Treated	
New std. hex head, packed			
5/16" x 6" and smaller and shorter	38	28	
5/16", 3/4", 1", 1 1/2" x 6" and shorter	15	1	
New std. hex head, bulk*	50	42	
5/16" x 6" and smaller and shorter	32	21	

* Minimum quantity per item: 15,000 pieces 5/16", 5/16", 3/4" diam. 5,000 pieces 7/16", 1", 1 1/2", 9/16", 5/8" diam. 2,000 pieces 5/16", 3/4", 1" diam.

Machine Screws

	Discount	
Packaged, gross list	44 1/2—10	
Bulk, bulk list*	17	

* Minimum bulk quantity, 15,000 pieces per item.

Machine Screw & Stove Bolt Nuts

Packaged, package list	36—10
Bulk, bulk list*	17

* Minimum bulk quantity, 15,000 pieces per item.

REFRACTORIES

Fire Clay Brick	Carloads per 1000
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add \$5.00)	\$114.00
No. 1 Ohio	107.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	107.00
No. 2 Ohio	98.00
Ground fire clay, net ton, bulk (except Salina, Pa., add \$1.50)	17.00

Silica Brick	
Mt. Union, Pa., Ensley, Ala.	\$120.00
Childs, Hays, Pa.	125.00
Chicago District	130.00
Western Utah	
California	
Super Duty	
Hays, Pa., Athens, Tex., Windham	137.00
Curtner, Calif.	155.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	20.00
Silica cement, net ton, bulk, Hays, Pa.	22.00
Silica cement, net ton, bulk, Chicago District, Ensley, Ala.	21.00
Silica cement, net ton, bulk, Utah and Calif.	

Chrome Brick	Per net ton
Standard chemically bonded Balt.	\$86.00
Standard chemically bonded, Curtner, Calif.	96.50
Burned, Balt.	80.00

Magnesite Brick	St. 3/8-in. grains
Standard Baltimore	\$109.00
Chemically bonded, Baltimore	97.50
Grain Magnesite	
Domestic, f.o.b. Baltimore	
in bulk fines removed	\$64.40
Domestic, f.o.b. Chewelah, Wash.	
Luning, Nev.	
in bulk	38.00
in sacks	43.75
Dead Burned Dolomite	Per net ton
F.o.b. bulk, producing points in:	
Pa., W. Va., Ohio	\$14.50
Midwest	14.60
Missouri Valley	13.65

FLUORSPAR	
Washed gravel, f.o.b. Rosiclare, Ill.	
Price, net ton; effective CaF ₂ content	
72 1/2%	\$44.00
70% or more	42.50
60% or less	38.00

METAL POWDERS	
Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.	
Swedish sponge iron c.i.f.	11.25¢
Canadian sponge iron,	
Del'd in East	12.00
F.o.b. ship pt., carloads	9.5¢
Domestic sponge iron, 98+%	
Fe, carload lots	18.00
Electrolytic iron, annealed, 99.5+%	38.00
Electrolytic iron, unannealed, minus 325 mesh, 99+%	53.5¢
Hydrogen reduced iron minus 300 mesh, 98+%	63.00 to 80.00
Carbonyl iron, size 5 to 10 microns, 98%, 0.08+%	82.00 to 148
Aluminum	31.5¢
Brass, 10 ton lots	29.50¢ to 36.50¢
Copper, electrolytic	43.50¢
Copper, reduced	43.50¢
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic, 99% min., and quality, del'd	\$3.60
Lead	21.00¢
Manganese	57.0¢
Molybdenum, 99%	\$2.75
Nickel, unannealed	89.50¢

Ferroalloy Prices

(Effective Sept. 14, 1954)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd, 65-72% Cr, 2% max Si.	
0.025% C .. 36.00	0.15% C .. 33.75
0.025% C ..	0.20% C .. 33.50
Simplex .. 34.50	0.50% C .. 33.25
0.06% C .. 34.50	1.00% C .. 33.00
0.10% C .. 34.00	2.00% C .. 32.75
65-69% Cr, 4-9% C ..	24.75
62-66% Cr, 4-6% C, 6-9% Si ..	25.60

S. M. Ferrochrome

Contract prices, cents per pound, chromium contained, lump size, delivered.	
High carbon type: 60.65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.	
Carloads ..	25.85
Ton lots ..	28.00
Less ton lots ..	29.50

High-Nitrogen Ferrochrome

Low-carbon type 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 3¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.	
0.10 max. C ..	\$1.18
0.50% max. C ..	1.16
9 to 11% C ..	1.25

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed, lump 4-in. x down, 24.75¢ per lb contained Cr plus 12.00¢ per lb contained Si. Bulk 2-in. x down, 25.05¢ per lb contained Cr plus 10.80¢ per lb contained Si. Bulk 1-in. x down, 25.25¢ per lb contained Cr plus 11.00¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, lump, delivered.	
30-33% Cr, 60-65% Si, 3.00 max. Fe.	
Carloads ..	19.00
Ton lots ..	22.10
Less ton lots ..	23.60

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.	
16-20% Ca, 14-18% Mn, 53-59% Si	
Carloads ..	20.00
Ton lots ..	22.30
Less ton lots ..	23.30

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.	
Ton lots ..	17.50
Less ton lots ..	19.50

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.	
Carload lots ..	16.60
Ton lots ..	18.10
Less ton lots ..	19.35

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%; Ti 9 to 11%, Cr 5 to 7%.	
Carload packed ..	17.50
Ton lots to carload packed ..	18.50
Less ton lots ..	20.00

Ferromanganese

Maximum contract base price, f.o.b. lump size, base content 74 to 76 pct Mn; Producing Point	Cents per-lb
Marietta, Ashland, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	9.50
Clairton, Pa.	9.50
Sheridan, Pa.	9.50
Philo, Ohio	9.50
Add or subtract 0.1¢ for each 1 pct Mn above or below base content.	
Briquets, delivered, 66 pct Mn:	
Carloads, bulk ..	12.05
Ton lots packed ..	13.65

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerston, Pa.	
Manganese	Silicon
16 to 19%	3% max.
19 to 21%	3% max.
21 to 23%	3% max.
23 to 25%	3% max.

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.	
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.	
Carload, packed ..	45.00
Ton lots ..	43.50

Electrolytic Manganese

f.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.	
Carloads ..	30.00
Ton lots ..	32.00
250 to 1999 lb ..	34.00

Medium Carbon Ferromanganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.	
Carloads ..	30.00
Ton lots ..	32.00

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.	
Carloads	Ton Less
0.07% max. C, 0.06%	
P, 90% Mn ..	22.00
0.07% max. C ..	29.95
0.15% max. C ..	28.45
0.30% max. C ..	26.95
0.50% max. C ..	26.45
C, 80-85% ..	25.30
Mn, 5.0-7.0% Si ..	23.45

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mo, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢.	
Carload bulk ..	11.00
Ton lots ..	12.65
Briquet contract basis carlots, bulk, delivered, per lb of briquet ..	12.65
Ton lots, packed ..	14.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$92.00 gross ton, freight allowed to normal trade area.	
Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$89.50. Add \$1.00 per ton for each additional 0.50% Si up to and including 17%. Add \$1.45 for each 0.50% Mn over 1%.	
Ton lots ..	17.50
Less ton lots ..	19.50

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.	
Ton lots	Carloads
96% Si, 2% Fe ..	20.10
97% Si, 1% Fe ..	20.60

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si briquets.	
Carloads, bulk ..	6.75
Ton lots ..	8.35

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, delivered.	
25% Si ..	20.00
50% Si ..	12.00
65% Si ..	13.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.	
Cast Turnings Distilled	
Ton lots ..	\$2.05
Less ton lots ..	2.40

Ferrovanadium

35-55% contract, basis, delivered, per pound, contained V.	
Openhearth ..	\$2.00-\$3.10
Crucible ..	3.10-3.20
High speed steel (Primos) ..	3.20-3.25

Alsifer, 20% Al, 40% Si, 40% Fe, Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads ..	9.15
Ton lots ..	10.15

Calcium molybdate, 46.2-46.6%, f.o.b. Langeloeth, Pa., per pound contained Mo ..

11.15

Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered per pound contained Cb.

12.00

Ferromolybdenum, 55-75%, f.o.b. Langeloeth, Pa., per pound contained Mo ..

11.15

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$4.00 unitage, per gross ton ..

\$90.00

Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., freight allowed, ton lots, per lb contained Ti ..

11.15

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., freight allowed, ton lots, per lb contained Ti ..

11.15

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton ..

\$177.00

Ferrotungsten, ¼ x down, packed, per pound contained W. ton lots, f.o.b.

11.15

Molybde oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloeth, Pa., bags, f.o.b. Washington, Pa., Langeloeth, Pa.

11.15

Simanil, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb ..

</div

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Eliminate cumbersome expensive threading and fabrication of pipe assemblies with "ELLS." It is now possible to bend 1" pipe and have only 1" of tangent on one end. The ell shown is 1" pipe, bent to a 2½" radius. Production machines with automatic duplicate bending relays are available up to and including 6" extra heavy pipe. The machine shown is the model "A-6" which has a bending capacity of 2" extra heavy pipe. Smaller and larger machines are available. The same machine can be used for bending tubes, structural shapes, reinforcing bars, etc., by merely changing the die.

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Type C



Type K

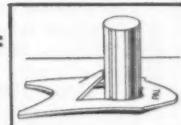
For unthreaded Rods and Axles

Used on wheels of play vehicles;
also other permanent applications.

Place PUSHNUT on rod, tap with hammer. Patented locking method resists 100 lbs. or more. Eliminates threading, notching, cotter pins. Made of heat-treated spring steel, in pleasing acorn or semi-acorn styles and various finishes, for $\frac{3}{16}$ ", $\frac{1}{4}$ " and $\frac{5}{16}$ " rod.



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Ideal for nameplates, mouldings
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Slips easily over stud, instantly locks with push of simple inexpensive applicator. Spring tension pulls parts snugly to base—energized grip holds tight against loosening or rattling. Choice of finishes for $\frac{3}{16}$ ", $\frac{1}{4}$ " and $\frac{5}{16}$ " studs.

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6" bar GIDDINGS & LEWIS Floor Type
Horizontal Boring Mill, with hi-speed
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No. 1H MILWAUKEE Plain Horizontal Mill,
new 1941
No. 2H KEARNEY & TRECKER Horizontal Mill,
new 1943
No. 2MI CINCINNATI Vertical Mill, new 1951
No. 3-24 CINCINNATI High Power Plain Mill,
rectangular overarm
16" x 54" centers SIDNEY Tri-trol Lathe,
taper attachment, chuck, 7 1/2 HP motor, new
1942
No. 3A WARNER & SWASEY Turret Lathe, Tim-
ken Spindle, electric chuck, tooling
No. 4 WARNER & SWASEY Turret Lathe, Pre-
selector head, Bar feed, new 1943
No. 12 GISHOLT Automatic Lathe, new 1947
16" GOULD & EBERHARDT Industrial Shaper
with AC motor, vise, power rapid traverse,
new 1944
42" BULLARD Spiral Drive Vertical Turret
Lathe, extra high column
3" bar UNIVERSAL Table Type Horizontal Boring
Mill, new 1947

4" bar GIDDINGS & LEWIS Table Type
Horizontal Boring Mill, extra wide
table, new 1943

30" MORTON Hydraulic Keyseater, 1942
No. 6 MITTS & MERRILL Keyseater, capacity
0 to 3" width, 30" stroke
4' FOSDICK Sensitive Radial Drill, new 1951
4' HAMMOND Jackknife Radial Drill tapping
attachment, new 1948
5' 13" column CARLTON Radial Drill, AC mo-
tor & gearbox on base
6' 17" column CINCINNATI BICKFORD Super
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motor on arm
48" widened to 69" x 12' DETRICK & HAR-
VEY Double Housing Planer, box table, DC
reversing motor drive
36" ROCKFORD Hydraulic Openside Shaper,
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48" x 48" x 12' CINCINNATI Double Housing
Planer, 2 rail heads, 1 side head, power
rapid traverse

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THE CLEARING HOUSE

News of Used and Rebuilt Machinery

Good Mill Business . . . A de-
cided pickup in business is re-
ported by dealers in steel mill
equipment, in the Pittsburgh area,
but in other lines an improvement,
if any, is not so noticeable.

August was a good month in the
steel mill field, with one dealer
completing four orders; further-
more prospects are good for ad-
ditional business.

In other directions, August
probably was the low month of the
year. Most brokers and dealers
look for an improvement in Sep-
tember on the basis of inquiries
and better activity in customer in-
dustries.

Meet Keen Competition . . . But
stiff competition will be the rule.
Most deals are being made on the
basis of price and promptness of
delivery. Dealers also are con-
fronted with the problem of direct
deals, where the dealer is circum-
vented in the interest of saving a
commission.

In machine tools, buyers are not
as hesitant as they were. Buyer in-
terest is spread over a wide range
of equipment. Auction sales are at
an improved rate.

Price and delivery are the
watchword on cranes. Purchasing
agents are cautious, apparently
waiting for a definite improve-
ment in their own business before
committing themselves on a deal.
One buyer recently admitted that,
while a crane was on his agenda
for purchase, his company ur-
gently needed a motor for exist-
ing equipment and he could not
get serious about further expendi-
tures until business improved
somewhat.

Dollar Volume Up . . . A healthy
minority of Midwest dealers are
reporting noticeably higher dollar
totals for July and August than
for previous months.

Their experience suggests that
there are enough hold-outs who

were doing well in July to raise
the industry total substantially
over what was expected by many
used machine tool sellers who
were feeling the vacation time
pinch sharply in July. And not one
of the three did as badly in July
as they were doing in first quarter
this year, when nearly all indus-
try was limping badly.

Summer Was Slow . . . Recap-
ping reports from all sections of
the nation it's evident that the
used machinery business for the
summer just past was discourag-
ingly slow after the pickup of in-
quiries and sales that had the in-
dustry in a state of cautious opti-
mism during May and June.

The vacation shutdown had a
longer-lasting dampening effect
on business than the springtime
optimists had hoped for. Dealers
who expected a brief vacation
shutdown lull and began a gradual
increase of their inventories in
anticipation of August activity
were disappointed. Inquiries
slipped and sales remained off.

Not All Dark . . . There were
some bright spots however. Heavy
equipment sales, though scat-
tered, served to bolster dollar vol-
ume to some extent. On the West
Coast sheet-metal equipment re-
mained in good demand. Press
brakes and shears moved steadily
although at rock bottom prices.

The machinery rebuild program
set up by Army Ordnance in co-
operation with Machinery Dealers
National Assn. filled in some gaps
for dealers with rebuilding facil-
ties. Outside rebuilding held up
generally through the Midwest.

Auction activity continued
through the season but was re-
ported slower than during the
spring months with prices consid-
erably softer.

Generally it was a disappointing
summer after the promise of late
spring activity.